

Master's Programme in Information Networks

Integrating data-driven management into municipal work

Redesigning a municipal dashboard for everyday use

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Abstract

Most Finnish municipalities are facing growing financial distress, making continuous understanding of resources essential across departments and roles. In response, data-driven management has been promoted to ground decisions in evidence, and various tools and platforms have been introduced to support this approach. However, these systems have remained outside everyday routines for most employees, so data-driven management has not reached the level municipalities want.

This thesis explores how data-driven management can be better integrated into municipal decision-making, and how digital systems can support this process. Using Softwave's Johdon Työpöytä (JT) as a case example, this study examines users' needs and challenges to help redesign a UI that better supports these goals. Applying a design science research (DSR) approach, this work combines interview insights with existing literature to identify design opportunities, such as so-called nudging techniques, that help municipalities embed data-driven management more deeply into their operations.

Interviews with municipal employees indicate that despite the stated goal of ensuring staff commitment and ownership of the budget and finances, the adoption of the system remains weak. Many employees view data tracking as outside the scope of their role, and that leadership has not driven uptake of JT strongly enough. Users appreciate the system's visual data, but the overall user experience lacks sufficient user-friendliness. The amount of data causes information overload and reduces users' motivation to keep using the system.

This thesis contributes both an understanding of municipalities' needs in data-driven management and a practical design that addresses them. The redesigned *JT* produced in this study applies usability heuristics and nudging techniques, such as simplification, messenger effects, and social norms, to improve engagement and encourage regular use. Concrete improvements like clearer navigation, search, and customizable dashboard reduce cognitive load and make the data easier to access, interpret, and act on in daily work. Together, these solutions demonstrate how usability and behavioural design can help municipalities embed data-driven management more naturally into everyday decision-making.

Keywords data-driven management, usability, digital nudging, user engagement, design science research, user interface design

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Tiivistelmä

Iso osa Suomen kunnista on yhä suurenevan taloudellisen paineen edessä, mikä tekee resurssien jatkuvasta seurannasta välttämätöntä kaikilla kunnan hallinnon aloilla. Ratkaisuna tähän onkin usein korostettu tiedolla johtamista, jossa päätöksenteko pyritään perustamaan tietoon ja dataan. Tätä lähestymistapaa tukemaan onkin kehitetty erilaisia digitaalisia työkaluja. Nämä tiedolla johtamisen työkalut ovat kuitenkin pitkälti jääneet päivittäisen toiminnan ulkopuolelle, eikä tiedolla johtaminen ole saavuttanut kunnissa toivottua tasoa.

Tämä diplomityö tutkii, miten tiedolla johtaminen voidaan integroida paremmin osaksi kunnallista päätöksentekoa, ja miten digitaaliset järjestelmät voivat tukea tätä prosessia. Tutkimus hyödyntää erästä tiedolla johtamisen työkalua, Softwaven *Johdon Työpöytä* (JT), jonka käyttäjien tarpeita ja haasteita tarkastellaan JT:n käyttöliittymän uudelleensuunnittelun pohjaksi. Tutkimus hyödyntää suunnittelutieteellistä (DSR) menetelmää, jossa kunnan työntekijöiden haastatteluista saadut löydökset yhdistetään tieteelliseen kirjallisuuteen käytettävyydestä ja digitaalisista tuupausmenetelmistä. Työn tavoitteena on tunnistaa millaiset suunnitteluratkaisut voivat tukea tiedolla johtamisen juurtumista osaksi kuntien hallinnollisten työntekijöiden päivittäistä toimintaa.

Haastattelut osoittavat, että vaikka selkeänä tavoitteena on saada henkilöstö seuraamaan erityisesti talouden perustietoja ja budjettia, järjestelmien hyödyntäminen on edelleen vähäistä. Moni työntekijä ei koe talouden seurantaan osaksi omaa työnkuvaansa, eikä johto ole riittävästi tukenut tuotteen käyttöönottoa ja levittämistä. Käyttäjät näkevät tuotteen visuaalisuuden sen isona vahvuutena, mutta käytettävyys koetaan yleisesti suhteellisen heikoksi. Datan suuren määrän koetaan aiheuttavan myös informaatiokuormitusta, mikä vähentää halua käyttää järjestelmää.

Työ lisää ymmärrystä kuntien tiedolla johtamisen tarpeista, sekä käyttöliittymän suunnittelumenetelmistä, joilla voidaan pyrkiä vastaamaan näihin tarpeisiin. Tässä työssä tuotetun uudelleen suunnitellun JT:n käyttöliittymä hyödyntää käytettävyyden periaatteita sekä digitaalisia tuupausmenetelmiä, kuten yksinkertaistamista, viestintuojavaikutusta, sekä sosiaalisia normeja sitoutumisen ja säännöllisen käytön edistämiseksi. Parannusehdotukset sisältävät muun muassa selkeämmän navigoinnin, hakutoiminnon, sekä muokattavan etusivunäkymän, joiden avulla pyritään vähentämään kognitiivista kuormitusta ja helpottavan datan hyödyntämistä kunta-arjen päätöksenteossa. Tulokset osoittavat, kuinka käytettävyydellä ja käyttäytymiseen perustuvalla suunnittelulla voidaan pyrkiä auttamaan kuntia juurruttamaan tiedolla johtamisen luontevaksi osaksi päivittäistä toimintaa.

Avainsanat Tiedolla johtaminen, käytettävyys, käyttäjien sitouttaminen, käyttäytymismuotoilu, digitaaliset tuupausmenetelmät, käyttöliittymäsuunnittelu

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Vanessa Pihlaja

Symbols and abbreviations

Abbreviations

JT	Johdon Työpöytä
DSR	Design science research
DSRF	Design science research framework
UI	User interface
UX	User experience
FBM	Fogg Behaviour Model

1 Introduction

The aim of this thesis is to understand how data-driven management can be integrated into everyday municipal work and how digital systems can help municipalities operate effectively under tightening budget constraints. The study investigates these needs using Softwave's Johdon Työpöytä (JT), municipalities' management dashboard tool, as a case example. By examining JT's users' needs and challenges, the thesis seeks to uncover what kind of user interface (UI) design can better support the objectives of data-driven management and encourage sustained use in practice.

The study employs a design science research (DSR) approach by combining interview insights from municipal employees with the findings from existing literature. The goal is to identify design principles and nudging techniques that can improve engagement and usability and help answer the users' needs better. The resulting artefact, a redesigned version of JT's UI, serves as both a practical example and a means to explore how digital design can help municipalities embed data-driven management more deeply into their daily decision-making.

This chapter highlights the importance of the topic and the motivation behind it. It also outlines the context, research objectives, and the structure of the thesis.

1.1 Motivation and context

A recent report by the Association of Finnish Municipalities (2025a) highlights that many Finnish municipalities are facing a tightening financial outlook. The report states that municipal tax rates are expected to grow to unseen levels in big part of the country. This creates major challenges for local governments, especially in ensuring equal access to services across regions. The

growing challenge puts extra pressure on municipalities to find new ways to manage finances and deliver services efficiently. One solution to this is data-driven management: using data to make better decisions. Data-driven management can help target resources, spot problems early, and cut waste. If done well, it improves effectiveness, deliver savings, and makes choices more transparent. Digital tools for data-driven management can support this in everyday municipal work. They bring key indicators into one place, link budgets to service outcomes, and provide views that highlight urgent issues. These tools reduce manual data gathering and reporting. They also support routine follow-up and help municipalities steer finances more proactively.

One such digital system is Softwave's Johdon Työpöytä (JT), a management dashboard tool, primarily used by municipal management and administrative staff. It is used to track budgets, operational data, and goals, and to support data-informed decision-making and reporting needs. This thesis is carried out as a commissioned project for Softwave. I work independently as the author, while Softwave acts as the client. They provide product context and review the feasibility of proposed changes.

Despite JT's capabilities, the product has faced a practical challenge: low engagement and everyday use. In most customer organisations, only a handful of people actively use the product, but the broader group has not yet committed. Softwave's prediction is that the UI design is related to the issue. They've received user feedback that it takes time to learn how to use the system and that it could be more intuitive. The company has been focusing more on technical development, while the design has not been invested in because of limited resources and skills. Therefore, Softwave's ambition is to understand the reasons behind low usage and improve the UI to increase engagement. In addition, they are eager to learn how to design better municipal interfaces.

1.2 Research objectives and questions

This thesis examines how data-driven management can be better supported in municipalities and what kind of user interface design can help achieve this. There are two objectives: first, to understand municipalities' needs in data-driven management, and second, to explore how digital tools can be designed to meet these needs more effectively. These objectives are examined here through the case of Johdon Työpöytä (JT), by exploring user needs, challenges, and current experiences, and by proposing design improvements that support more regular and purposeful use in everyday work.

The study identifies what municipal management and administrative staff require from data-driven management systems, what currently hinders their use, and how the user interface could be improved to better support their needs. Based on these insights, the research proposes a set of design solutions that aim at increasing engagement and making data a more integral part of municipal decision-making.

This study focuses on a single platform, Johdon Työpöytä (JT), and the users of that specific system. Due to the limited scope, the work targets selected user groups and specific interface areas rather than aiming for a full product redesign. While the findings are based on JT and its users, the results are discussed also in a broader municipal context to highlight potential implications for similar data-driven municipal systems. It is also acknowledged that not all user needs and challenges can be addressed through interface design alone, as the challenge of low engagement is unlikely a pure UI design issue.

The research objectives are achieved by answering these research questions:

RQ1: What specific challenges or tasks do users hope to address with the product, and what usability issues hinder their current experience?

RQ2: What type of user interface design would address the identified goals and challenges, and improve user engagement?

RQ1 is answered based on user interviews, which clarify what users aim to achieve with JT and where the current system fails to support these goals. RQ2 then combines the insights from RQ1 with theoretical knowledge on usability and digital nudging into a concrete UI design proposal. Together, these questions help to understand how UI design can better support data-driven management in municipalities and encourage more sustained use of JT.

1.3 Structure of the thesis

The first chapter of the thesis motivates the study and presents the objectives and research questions. After the introduction, the thesis has two main parts: a theoretical background and an empirical study. The second chapter reviews the background on data-driven management in municipalities, usability and engagement in digital interfaces, and behavioural design with digital nudging and its ethics. The third section covers the methodology, research process, data collection and analysis, artefact development, and ethical considerations. After that, the interview results are reported. The fifth chapter presents the artefact, the redesigned JT user interface, and links design choices to the interview findings. Finally, the main conclusions, along with their practical and theoretical implications, limitations, and directions for future research are presented.

2 Background

This chapter provides the theoretical background for this study. It reviews the existing literature and concepts that form the foundation for the research and the artefact design. The aim is to understand the broader context of data-driven management in municipalities and to outline the key theoretical areas that guide the design work.

The first section introduces the municipal environment in which data-driven management takes place and discusses the organisational structures and the current state of data-driven practices in municipalities. This is followed by a review of the prior research on usability and engagement in digital systems, and an overview of behavioural design and digital nudging as approaches to support sustained use. Together, these topics establish the conceptual basis for understanding the municipal context and informing the redesign of the JT.

2.1 Data-driven management in municipalities

Data-driven management in municipalities takes place in a multi-layered environment, where both political actors and municipal employees play a role. Decision-making is guided by legislation, strategic objectives, and financial constraints, and it is supported by a variety of information systems and reporting tools.

In municipalities, decisions are typically made through formal processes that combine political deliberation with input from municipal workers and specialists. Understanding the municipal organisational structure, decision-making bodies, and possible user groups is essential for defining who might use a given system, for what purposes and in what context. These aspects are explored in section 2.1.1.

Municipalities also operate in a challenging environment where financial pressures and efficiency demands can influence how data is used in management and decision-making. While the importance of data-driven management is widely recognised, its practical implementation remains low across municipalities. Section 2.1.2 examines these financial and organisational factors in more detail and discusses the current maturity and challenges of data-driven management in Finnish municipalities.

2.1.1 Organisational structure in Finnish municipalities

There are currently 308 self-governance municipalities in Finland, which are responsible for providing part of public welfare services, like education, infrastructure, and cultural services (The Association of Finnish Cities and Municipalities, 2025b; Ministry of Finance, 2025). The authority and decision-making power in municipalities is divided for a multi-layered governance model, which involves both political actors and municipal employees. Understanding this structure is essential for identifying the system's users and their responsibilities.

At the top of the municipal decision-making hierarchy is the municipal council, which is elected every four years with local elections. It is the highest decision-making body, and its responsibilities include setting the municipality's strategic goals, approving budgets, and making key policy decisions. Beneath the council operates the local executive (municipal board), which oversees the implementation of the council's decisions, manages municipal administration and finances, and ensures the legal side of operations. The local executive is supported by various committees, which focus on specific sectors and prepare matters for decision-making. All these bodies consist of elected representatives rather than employees of the municipality. (The Association of Finnish Cities and Municipalities, 2025b.) This structure ensures that local decision-making has a strong democratic base.

The administrative side of the municipality, or municipal officers as Jalonen (2006) put it, is led by a chief executive or mayor, who acts as the head of municipal administration and financial management, reporting to the local executive. Under their leadership, the municipality is divided into departments or sectors, each of which is responsible for delivering services in its domain. Typically, there are own departments for example for education, early childhood care, public transport, water and waste management, building supervision, and employment services. These units are staffed by full-time civil servants and other municipal employees, who handle administrative and operational tasks and manage the services. (Anttiroiko et al., 2007.) The relationships and interactions between different municipal actors are illustrated in Figure 1 (Jalonen, 2006).

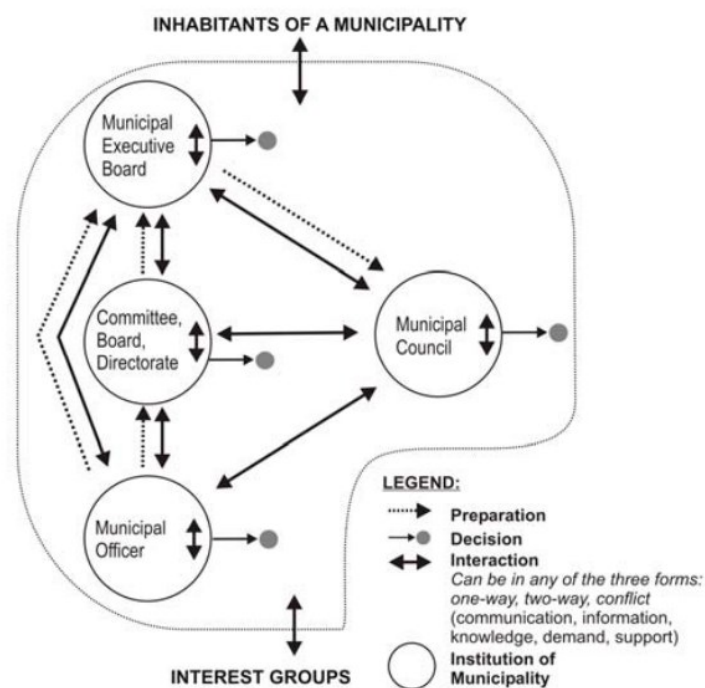


Figure 1: Finnish municipal preparation and decision-making process (Jalonen, 2006).

This division between political leadership and the administrative side creates distinct user groups for data-driven management tools like JT. Political

decision-makers may use the system more to review specific indicators when preparing or making bigger decisions, while the administrative side follows more detailed data continuously to support their daily operations and planning. Understanding these different roles and needs is essential for designing UIs that serve the needs of both strategic oversight and day-to-day management.

2.1.2 Drivers and current state of data-driven management in Finnish municipalities

Finnish municipalities are facing increasing financial pressures, which make efficient data-driven management more important than ever. In 2024, municipal debt grew by 720€ million, reversing the previous years' declining trend. This weakening financial position was partly explained by a 250€ reduction in state grants, a weak economic cycle, and rising interest costs. At the same time, municipalities face high investment needs and the ongoing challenge of controlling expense costs. (The Association of Finnish Cities and Municipalities, 2025c.) In this context, the ability to base decisions on data is critical for prioritizing resources, improving efficiency, and ensuring that limited budgets achieve the best possible impact.

Given these financial constraints, the importance of data-driven management in municipalities become even greater. This need is also recognised at the national level. Data-driven management (*tiedolla johtaminen*) in the public sector has been increasingly emphasised since the mid 1990s as a means to improve organisational performance, support understanding of residents' needs, and enable the provision for better and more efficient services (Kivimäki et al., 2023) In this public-sector context, data-driven management refers to systematic process where data is turned into information and knowledge, which enables more informed, efficient, and transparent management and decision-making (Helander et al., 2020).

However, the practical implementation of data-driven management in municipalities still faces significant challenges. A maturity assessment by Kivimäki et al. (2023) evaluated the state of data-driven management in Finnish municipalities. The results placed municipalities at a “developing” level (3/5), with strengths identified in leadership and individual competencies. However, weaknesses were noted in the systematic nature of data-driven management, its integration into organisational leadership, and the reporting and analytics. The findings also indicated that there is no shared understanding of what data-driven management means within municipalities: only 14.5% of respondents reported having a common view, and just 29.9% felt that leadership actively shares information and participates in open discussion about data-driven actions. As the report notes: “Management needs a clear operating model for participating in data-driven management and leading by example in order to lay the foundation for developing practices and culture.” (Kivimäki et al., 2023.) These results highlight that while the value of data is recognised, there are significant structural and cultural barriers that still limit the use of data-driven practices to support municipal decision-making.

2.2 Usability and engagement in digital interfaces

Usability and engagement are central concepts to understand when the goal is to design digital interfaces that are actively used. While usability focuses on how effectively and efficiently a system supports users in accomplishing their tasks, engagement describes the extent to which users are motivated to adopt and continue using the system. Together, they help determine not only whether a digital tool is user-friendly, but also whether it can become a part of everyday practices.

In the context of municipal dashboards and data-driven management tools, usability ensures that complex data can be easily accessed, interpreted, and acted upon with minimal friction. The engagement on the other hand

represents the goal that the system is integrated into daily routines and seen as a valuable part in decision-making. And without usability, the engagement cannot develop.

In this section, the usability and engagement are first defined in the context of UI design, and then the key usability principles are introduced to provide a practical foundation for the redesign of the system. Following this, the specific requirements of dashboard-based tools are discussed. Finally, how usability can support sustained engagement and continuous use is explained.

2.2.1 Defining usability and engagement in interface design

Usability has become a critical factor in the success of digital systems, as users' expectations are only increasing and they have many alternatives to choose from. It is considered a key element of the broader user experience (UX) and is formally defined by the International Organization of Standardization (2019) in ISO 9241-210:2019 standard as *“the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”*. In other words, usability refers to how well users can interact with an interface to accomplish their goals with satisfaction and low effort. It is a quality attribute that, according to Nielsen (2012), describes how easy the user interface is to use.

Nielsen (2012) breaks usability down into five different quality components, which are learnability, efficiency, memorability, errors, and satisfaction. Learnability assesses how much effort users must invest to accomplish basic tasks on the first use. Efficiency measures how quickly users can perform wanted tasks once they have learned to use the interface. Memorability, on the other hand, is measured in proficiency of use after a period of not using the system. Errors are evaluated based on how many occur, how severe they

are, and how easily users can recover from them. And lastly, satisfaction reflects how pleasant and engaging the system is to use.

Nielsen (2012) also highlights utility as another key quality attribute in interface design. Utility refers to an interface's ability to meet users' needs, meaning it provides the necessary features. Utility and usability together determine how useful a product is, as neither alone is enough for success. A successful product must not only meet the user's needs but also allow them to achieve their goals efficiently and enjoyably.

In addition, usability is always context dependent. As stated in the ISO 9241-210:2019 standard mentioned earlier, a system can only be considered usable in relation to its intended users, the tasks they perform, and the environment in which it is used (International Organization of Standardization, 2019). This contextual view brings the concepts of usability closer to the broader idea of UX. UX includes not only functional aspects but also users' emotions, attitudes, and perceptions, while usability focuses on more specifically on task effectiveness, efficiency, and satisfaction (Hassenzahl & Tractinsky, 2006).

Alongside usability, user engagement is an important concept in interface design. User engagement, as defined by Attfield, Kazai and Lalmas (2011), refers to the quality of the user's experience with a system and can be understood at two complementary levels. First, engagement occurs within single session, where it reflects the depth of attention, interest, and involvement a user has while interacting with a system. Second, engagement extends across sessions, describing the extent to which users continue to return to the system over time, integrate it into their routines, and perceive it as valuable in supporting goals. (Attfield, Kazai & Lalmas, 2011.) Together these aspects show that engagement captures both immediate and the sustained relationship between user and system.

2.2.2 Usability principles

There are several sets of principles and heuristics that can be used to guide the evaluation and design of UIs. For example, Shneiderman's *Eight Golden Rules* (Shneiderman & Plaisant, 2010) and Gerhardt-Powals' *Cognitive Engineering Principles* (1996) are both well-known frameworks. In this thesis, however, the Nielsen's *Ten Usability Heuristics* (Nielsen, 1994), are used as a main usability guide. These heuristics are chosen as they are one of the most widely used design evaluation tools (Gonzales-Holland et al., 2017). They are particularly valuable because they help identifying a broad range of usability problems early in the design process and therefore enables designers to address issues cost-effectively before user testing is conducted (Gonzales-Holland et al., 2017). The Table 1 summarises the Nielsen's heuristics (1994) in a format that can be directly applied as a checklist in the redesign of the system in this thesis.

Heuristic	Description
1. Visibility of system status	The system should always keep users informed about what is happening, through appropriate feedback within reasonable time.
2. Match between system and real world	The system should use concepts, language, and conventions familiar to users.
3. User control and freedom	Users need a clear “emergency exit” to leave unwanted states.
4. Consistency and standards	Users should not have to think about whether different words, states, or actions mean the same thing.
5. Error prevention	Prevent problems from occurring in the first place by eliminating error-prone conditions or presenting users with confirmation option before committing to action.
6. Recognition rather than recall	Minimise user’s memory load by making options, elements and possible actions visible.
7. Flexibility and efficiency of use	The system should cater both inexperienced and experienced users by providing simple, guided options for beginners while also offering faster shortcuts and customization possibilities for expert users.
8. Aesthetic and minimalist design	Dialogues should not contain irrelevant or rarely needed information.
9. Help users recognize, diagnose, and recover from errors	Error messages specifying the issue should be expressed in plain language and suggest a solution.
10. Help and documentation	Provide necessary documentation to help users to complete their tasks, if needed.

Table 1. Nielsen’s 10 usability heuristics (Nielsen, 1994).

2.2.3 Designing for dashboard-based tools

Dashboards are often serving diverse user groups, from executives needing quick high-level summaries to specialists and analysts requiring more detailed insights. To meet these varying needs, dashboards should present essential information clearly while also enable exploration of more detailed data when required (Baskett, LeRouge & Tremblay, 2008). One typically used feature for this is the drill-down function, which allows users to begin from an overview and progressively navigate into more granular levels of information. This structured way of showing data ensures that the interface supports both needs for a quick overview and deeper analysis, helps adapt to the user's task and decision-making context (Baskett, LeRouge & Tremblay, 2008). This way a smaller amount of indicators can be shown and the risk of overwhelming users with too many details decreases.

Because dashboards can easily become complex, navigation also plays a critical role in maintaining usability. Users must be able to locate relevant dashboards and indicators, understand their structure, and switch smoothly between views. Consistent navigation elements, such as tabs, menus, breadcrumbs, or sidebars, can support finding the way and helping to reduce cognitive load by aligning with familiar interface patterns (Vora, 2009). Vora also reminds that clear labelling and predictable layouts further strengthen this effect and allow users to focus on interpreting the data rather than trying to work out the interface.

In addition, clarity is very important when designing dashboards, because users must be able to interpret information quickly (UXPin, 2025). If the layout is visually confusing, the key insights can easily be lost. To achieve this clarity, the most important information should be prioritised, and they should be presented in a logical and visually structured way. Thoughtful grouping, typography, and colours can be used to help direct users' attention to what matters most. UXPin (2025) also suggests that dashboards should allow

some customization, for instance, with filters, drill-downs or custom views, so that different users can adapt the view to their needs, while keeping the overall structure consistent.

2.2.4 From usability to engagement: Supporting continuous use

While usability ensures that a digital system can be operated effectively, efficiently, and with satisfaction, it does not itself explain why users continue to return to a system over time. Engagement complements usability by describing the emotional, cognitive and behavioural connection that develops between a user and a system, both within single sessions and across repeated interactions (Attfield, Kazai & Lalmas, 2011). Studies show that usability and engagement share some attributes, such as aesthetics, feedback and perceived control. However, engagement also includes broader qualities like novelty, challenge and long-term appeal. (O'Brien & Toms, 2008.) Thus, while good usability can support engagement, a usable system is not necessarily engaging. Instead, engagement can be seen as a higher-order experience that builds on usability and extends beyond it. For reaching the goals in data-driven management in municipalities, moving from usability to sustained engagement is essential. To achieve this, design must not only remove barriers to use but also help users to reach their goals and see the value of the system (O'Brien & Toms, 2008).

In this context, nudging can be seen as a complementary design approach. While usability provides the foundation for well-working interaction, nudging offers ways to encourage behaviour that supports motivation, engagement and more active use of a system (Lawrence et al., 2019). Through well-designed interface cues, users can be encouraged to explore relevant data, complete important actions, and extract more value from the system, and thereby strengthen the habit of returning to it. Nudging as a design approach, its theoretical foundations and concrete techniques are discussed in the next section.

2.3 Behavioural design in user interfaces

Behavioural design is an approach that applies principles from psychology and behavioural science to guide user actions and decisions. Rather than relying only on traditional usability improvements, behavioural design aims to influence user behaviour with strategic design choices. When used ethically, behavioural design can enhance user experience and help users achieve their goals more efficiently.

A common method within behavioural design is digital nudging, where UI elements are used to influence users' choices without restricting their freedom. Digital nudging does not replace usability in any way, but it can be used as a complement to enhance user experience. Nudges can be used for example to reduce cognitive load, support decision-making, and encourage more frequent and meaningful engagement with digital tools.

In public sector user interfaces, where users may have highly varied backgrounds and deal with large amounts of data, behavioural design and nudging methods can become particularly valuable. Carefully designed nudges can help users to better navigate and understand complex information, interact more confidently with digital systems, and thereby support better governance and more effective municipal management.

2.3.1 Psychological foundations of behavioural design

Behavioural design refers to the strategic use of design to influence user behaviour in predictable ways, based on principles from psychology, behavioural science and behavioural economics (Wendel, 2020). According to Wendel (2020), behavioural design is based on the understanding that people do not always act in a rational or deliberate ways. Instead, their behaviour is often shaped by cognitive biases and heuristics, known as mental shortcuts, which affect how they perceive information, make decisions, and take action. He emphasizes that effective behavioural design works specifically with these psychological tendencies rather than against them. The goal with behavioural design is to create environments and interfaces that guide behaviour intuitively, by leveraging how the human mind naturally operates under constraints such as limited attention, willpower and cognitive capacity.

Traditional design approaches primarily focus on usability, visual appeal and technical functionality, whereas behavioural design places user's psychological and behavioural patterns at the centre of the design process. As Norman (2013) explains, traditional user-centred design aims to make products intuitive, efficient, and aesthetically pleasing by aligning them with users' goals and capabilities. The Interaction Design Foundation (2023) further notes that while traditional design aims to remove friction and improve efficiency, behavioural design goes further by motivating and guiding users toward beneficial actions, such as making better decisions or developing productive habits.

One of the key psychological theories that helps explain why behavioural design is effective is dual-process theory, which describes how people think and make decisions using two different mental systems. System 1 is fast, automatic, and intuitive, while system 2 is slower, deliberate, and requires mental effort. (Evans & Stanovich, 2013.) They describe system 1 to operate effortlessly, drawing on learned associations, context, and past experiences,

and to make rapid decisions without conscious thought. As Kahneman (2011) explains in his famous book *Thinking, Fast and Slow*, most everyday decisions are made using System 1, since people mostly rely on quick judgments rather than careful reasoning. Behavioural design also typically aims to influence users by working with these intuitive and automatic processes, rather than relying on reflective analysis (Wendel, 2013). Wendel argues that behaviour change is likelier when it works with automatic thinking rather than requiring extensive conscious consideration.

One widely used model in behavioural design is the Fogg Behaviour Model (FBM), which demonstrates how behaviour occurs when three elements converge at the same moment: motivation (M), ability (A), and trigger (T) (Fogg, 2009). This relationship is summarised as B (behaviour) = MAT in the model. If any of the three elements is missing, the desired behaviour is unlikely to happen (Fogg, 2009). The model is useful in digital design, where users often face quick decisions with limited cognitive effort. For example, even if a user is highly motivated, they may not act unless the interface is simple enough (high ability). Vice versa, a highly usable system probably fails to create action if the user lacks motivation. Finally, triggers, such as certain contexts, notifications, prompts, or visual highlights, are needed to trigger the behaviour at the right moment (Fogg, 2009).

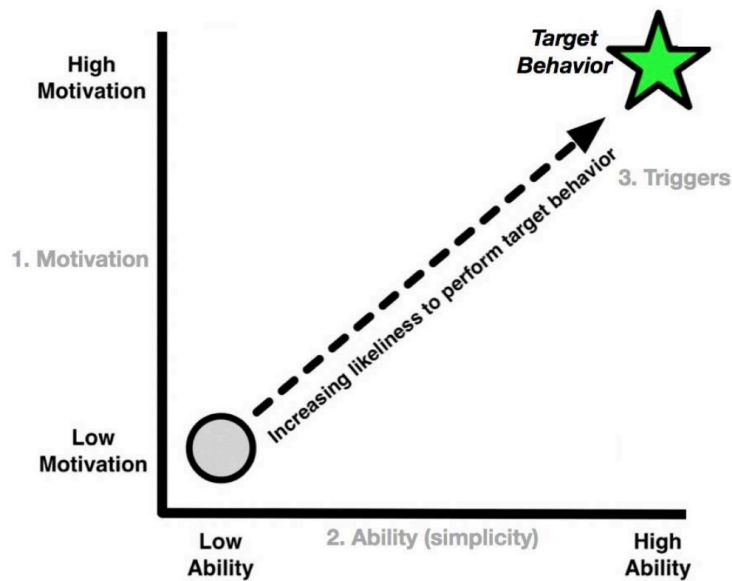


Figure 2. The Fogg Behaviour Model (Fogg, 2009).

As shown in the Figure 2, the likelihood of performing a target behaviour increases when motivation and ability are sufficiently high and an effective trigger is present. The FBM offers a simple but powerful framework for designing persuasive and behaviour-supporting systems.

2.3.2 Principles of digital nudging

Digital nudging refers to the use of UI elements to steer user behaviour without limiting available options in digital environments like websites or applications (Bergram et al., 2022). The concept is grounded in the idea of nudging, which Thaler and Sunstein (2008) define as modifications of the choice environment that aim to shape decisions while preserving freedom of choice. A central characteristic of nudging is that it doesn't comprehend user autonomy. So rather than forcing a specific choice, the interface subtly encourages certain behaviour over others, while still keeping all possibilities available. When applied transparently and ethically, digital nudging can support users in making better decisions for them, especially in complex or unfamiliar digital systems (Weinmann et al., 2016). In digital context, nudges can be implemented through different design features such as layout, wording, visual

cues like highlighting or prompting, or interaction timing. Digital nudging differs from traditional usability design so that cognitive biases and heuristics are intentionally leveraged to guide user actions, as Weinmann et al (2016) point out.

Digital nudging leverages the theories from behavioural economics and psychology. It draws from the idea that human decision-making is often not fully rational. Instead, our decisions are influenced by heuristics, known as mental shortcuts, and cognitive biases, such as the fact that people tend to avoid losses more strongly than they seek gains (Kahneman, 2011). A key concept behind digital nudging is choice architecture, which refers to the way choices are presented to users. Thaler and Sunstein (2008) explain that the structure of the choice environment can significantly impact what people choose, and even small changes can lead to different outcomes. Digital nudging applies exactly these ideas, only in online settings. By adjusting how options appear in a UI, designers can influence the use in subtle ways.

The primary goal of nudging *should* be to support the user in making better decisions in digital environments. This can show as helping users stay focused, reducing cognitive load, and making choices feel simpler or less overwhelming (Weinmann et al., 2016). Thaler and Sunstein (2008) also point out that nudges can guide attention to relevant options, encourage timely actions, and align behaviour with users' long-term goals or socially beneficial outcomes. Ethically acceptable nudging should also align with criteria such as transparency, freedom of choice, and a clear intention to increase either individual's own welfare or broader social welfare (Bergram et al., 2022). Thereby, nudging should not be misleading, and it must preserve users' ability to make their own choices. For example, a default for renewing a subscription that is hidden or difficult to opt out of is not ethical, only manipulative. Bergram et al. also highlight that understanding the context is relevant for designing successful nudging. What works in one situation may not be

effective in another. Therefore, understanding the user's needs, context environment, and human cognitive limitations is essential for designing meaningful and effective nudges.

2.3.3 Nudging techniques in interface design

There are different ways to categorise digital nudging techniques, and various studies have proposed distinct taxonomies depending on the research focus and context. Some focus on cognitive mechanisms of the methods, while others categorise nudges based on design patterns, environmental context or behavioural targets. (Bergram et al., 2022.) In this thesis, the classification developed by Valta and Maier (2025) is used as the basis for presenting different nudging techniques. This taxonomy, as they call it, is grounded in a comprehensive systematic literature review of the most recent studies, making it a relevant synthesis of the current research in the field. It categorizes digital nudges into ten distinct types based on their function and design, offering a broad view of the available method. The categories Valta and Maier (2025) formed are presented next.

Framing

Framing refers to presenting information in different ways to influence perception and decision, for example, "95% fat-free" versus "5% fat". By highlighting either the benefits or losses of an option, the same outcome can feel more or less attractive. It leverages users' sensitivity to how choices are worded, especially in contexts involving risk or trade-offs. In the Valta's and Maier's (2025) study, framing was most frequently mentioned in the review, indicating it being widely used and researched.

Status quo bias

This technique leverages users' tendency to stick with present situations. It works because the perceived effort or risk of change often feels greater than the potential benefits. Many users assume the default is the recommended

or “safe” choice. In digital interfaces, status quo nudges can be implemented, for example, through default settings, auto-enrollments, or pre-checked boxes.

Social norms

Social norm nudges aim to influence users by showing how others behave in similar situations. In digital environments, this often appears through elements like customer reviews, popularity labels, or usage statistics. For example, when a service is highlighted as “most booked this week” or a product has a thousand positive reviews, it can increase trust and encourage similar behaviour. These kinds of cues work by appealing to human tendency to seek social belonging and acceptance, and to align behaviour with that of others to fit in and make safe, socially validated decisions.

Messenger effects

This group includes methods that influence users through messages or notifications that guide attention or prompt action during decision-making. These messages can be email reminders, in-app prompts, or warning icons that make tasks more visible or urgent. For example, a notification reminding users of an upcoming deadline can increase the likelihood of task completion. Messenger nudges are especially effective for delivering timely, clear information that supports intended behaviour.

Priming

Priming works by shaping the environment in which a decision is made, for example, by showing information that highlights the possible outcomes of a choice. This can include visual elements, wording, or messages that affect how the user feels about the options. For instance, a budgeting app might display a friendly reminder like “You’re close to your saving goal” just before a purchase, which can lead the user to think twice before spending.

Loss aversion

Loss aversion nudging works by highlighting what the user might lose if they don't take action, rather than focusing on potential gains. People are more prone to experience the losses more strongly than the pleasure of a similar gain, which makes this technique effective. For example, a subscription service might warn users they will "lose access to key features" if they cancel, rather than simply listing the benefits of staying. This type of framing can motivate users to act in order to avoid a negative outcome.

Hyperbolic discounting

Hyperbolic discounting nudging is based on the tendency for people to prioritise immediate rewards over larger benefits in the future, even when the future outcome would be better. This bias can be leveraged in digital design by making long-term benefits feel more immediate, or by creating time-limited opportunities that prompt action. For example, a fitness tracker could highlight the calories burned "if you go for a walk right now" to make the reward feel instant.

Anchoring

Anchoring nudging works by presenting an initial reference point that influences how people judge subsequent options. Users tend to compare choices to this starting point, so changing the starting point, the so-called anchor, can shift their decisions. For example, on an e-commerce website showing the "regular price" before a discount can make the reduced price appear as a much better deal.

Simplification

Simplification nudging helps users by reducing the complexity of available options or information, making decisions easier to process. By presenting data in a clear and concise way, it aligns with the user's cognitive capacity and reduces decision fatigue. For example, a project management tool might

replace long status reports with a simple traffic light system (green, yellow, red) to indicate progress and allow users to quickly get hold of the current situation.

Decoupling

The decoupling nudges work by separating the perceived cost of a decision from the moment of consumption, which can make certain actions feel easier or less burdensome. By disconnecting payment or effort from the actual use of a product or service, users may be more willing to commit. For example, a business software provider could offer an annual subscription billed monthly, making the product's price feel lower than its actual total cost.

Having presented the different of digital nudging techniques, it is useful to consider how effective they are in practice. Research on nudging effectiveness is still fairly new, and especially in digital contexts, it has not yet been studied very extensively (Hummel & Maedche, 2019; Mertens et al., 2022). Meta-analyses in the broader nudging literature show that some techniques work better than others. Mertens et al. (2022) found that defaults (under status quo bias -category) had the strongest average effects across different contexts, which is in line with findings by Hummel and Maedche (2019). In their review, Hummel and Maedche reported a median effect size of 21 percent for nudges in general. However, the context matters, as Kusters and Van der Heijden (2015) note that a nudge can work well in one setting but have little effect in another. This means the choice of technique should be based on the user's environment and the specific user behaviours they aim to influence.

2.3.4 Ethical considerations of nudging

When influencing user behaviour and decisions, ethical aspects become a central concern. It is important to discuss them here as well, since often nudging is seen to be used to guide users' actions only to gain the company's

goals, not the users. Design patterns that intentionally mislead or pressure users into actions against their own interests are referred to as dark patterns (Sundin, 2021). Nudging has faced criticism, for a good reason, as there's a big risk for it crossing into manipulation and compromising users' autonomy (Meske & Amojo, 2020).

To address these concerns, Meske and Amojo (2020), have developed a step-by-step checklist (Figure 3) for evaluating and designing ethical digital nudges. First, it is essential to identify the target audience, understand their goals and determine which cognitive biases or heuristics the nudge builds upon. Second, the intended goal should be defined, and it should clearly support the user's own benefit or preferences. In the design phase, Meske and Amojo emphasise the importance of transparency and providing an easy way to opt out. Their model also distinguishes between nudges that target either fast, automatic thinking (system 1) or slow, deliberate thinking (system 2). For system 1 the nudges can be transparent or non-transparent, however non-transparent nudges require disclosure and user consent. System 2 nudges must always be transparent, otherwise they are considered manipulative. Finally, the nudge should be tested and evaluated to ensure it meets the intended goal without causing unintended harm. This framework is presented in more detail in Figure 3.

Ethical Guidelines for Digital Nudging: A stepwise approach			
Step 1: Understand the intentions of potential users and their cognitive heuristics and biases		<input type="checkbox"/> the target group has been thoroughly identified <input type="checkbox"/> the preferential choice set of your target group has been identified	
Step 2: Derive the goals of digital nudging		<input type="checkbox"/> the goals are in alignment with the users' preferential choice set and/ or stem from good intentions. They benefit and do not harm the user. <input type="checkbox"/> the potential impact is predictable	
Step 3: Design and implement the nudge			
<i>System 1 (Unreflective Thinking) fast, unconscious decision making & parallel/ convergent thinking</i>			
Transparent	<input type="checkbox"/> the choice architecture is presented in the most simplified way	Non-transparent	<input type="checkbox"/> justification for the need for non-transparency is given
Easy resistibility	<input type="checkbox"/> the nudge is easy and cheap to avoid. There are no costs to avoiding the nudge.	Disclosure	<input type="checkbox"/> simplified information about the nudge is provided
		Consent	<input type="checkbox"/> consent forms are provided requiring users to thoroughly read & opt-in to the terms and conditions to ensure informed consent, or informational nudges signaling preselected default-settings are provided, in cases where informed consent was already established
Non-controlling	<input type="checkbox"/> no incentive/ coercion was introduced to influence choice	Easy resistibility	<input type="checkbox"/> the nudge is easy and cheap to avoid. There are no costs to avoiding the nudge.
		Non-controlling	<input type="checkbox"/> no incentive/ coercion was introduced to influence choice.
<i>System 2 (Reflective Thinking) slow, conscious & sequential/ critical thinking</i>			
Transparent	<input type="checkbox"/> the choice architecture is presented in a simple and comprehensive way	Non-transparent	Designing non-transparent digital system 2 nudges (reflective) is considered manipulative. Therefore, the nudge should now be re-considered.
Easy resistibility	<input type="checkbox"/> the nudge is easy and cheap to avoid. There are no costs to avoiding the nudge.		
Non-controlling	<input type="checkbox"/> no incentive/ coercion was introduced to influence choice.		
Step 4: Evaluation of the digital nudge and iteration		<input type="checkbox"/> the nudge is consistent with the original goal and useful to influence the target behavior <input type="checkbox"/> there are no unintended negative consequences (e.g. malicious intent, monetary disadvantages) for the target group.	

Figure 3: Step-by-step framework for designing ethical digital nudges Meske and Amojo (2020).

However, it is important to understand that it is practically impossible to present choices completely neutrally, so the way options are structured will always influence decision-making to some degree (Thaler & Sunstein, 2009). This makes it essential for both designers and users to identify how choice architecture and nudging can affect behaviour. Increasing awareness of these methods can carry the risk of their unethical use, but it can also help

designers apply nudging more deliberately and avoid unintentionally creating harmful or misleading user experiences, as well as empower users to recognise and reject manipulative designs.

To sum up, this chapter outlined the context of data-driven management in municipalities, describing their organisational structures and responsibilities as well as the motivation and current state of data-driven practices. It also reviewed key concepts of usability, engagement, and nudging techniques, explaining how clear, intuitive, and guiding interfaces can encourage sustained use of digital tools. Together, these insights form the conceptual basis for the empirical study and guide the redesign of the JT interface to better support data-driven practices and increase engagement.

3 Methodology

This chapter gives an overview of the empirical part of this study. We will first go through what methodology was chosen and why. Second, the research process is explained in more detail, followed by chapters introducing how data was collected and then analysed. After that, the artefact development process is introduced shortly. Finally, we will discuss the ethical considerations of the study.

3.1 Research approach

In this study, the design science research (DSR) methodology is employed as the main research approach. The DSR was chosen based on the nature of the research objective, which is to solve a real-world problem through the creation of a purposeful solution that is strongly grounded in contextual understanding. As outlined by Hevner et al. (2004), DSR emphasizes the development and evaluation of an artefact that is designed to address the identified problems and to provide practical outcomes. Therefore, DSR is well-suited for this study as it allows us to combine theoretical knowledge with insights from the business environment to create a useful solution to the recognized problem (Hevner et al., 2004; Gregor & Hevner, 2013).

This study follows the core components of the DSR methodology, as outlined by Hevner et al. (2004), and applies them through the design science research methodology framework (DSRM) introduced by Peffers et al. (2007). First, a relevant problem and its underlying motivation are identified to establish the importance of the work. Based on this, the objectives for the solution are defined to guide the design. While the DSRM framework typically includes an evaluation phase to assess the artefact's effectiveness in practice, this study does not cover the evaluation within its scope due to time and resource constraints. Instead, a plan and recommendations for

future testing are provided in Chapter 6. Finally, the knowledge gained through the process and the final artefact are documented and shared with both the academic community and the client organisation.

The study is guided by a pragmatic worldview, that focuses on real-world problems, consequences and practical solutions. This perspective supports the use of both theoretical and empirical insights to find what works best in a given context (Creswell & Creswell, 2017). In this study, the aim is not to test a theory but to solve a practical problem in collaboration with the client company. The chosen methods, including qualitative interviews and the design process, reflects this pragmatic orientation toward actionable outcomes.

In addition to DSR, this study adopts a qualitative research approach to gain an understanding of the problem of context. The qualitative approach is particularly well-suited for exploring complex real-world phenomena from the perspective of people involved (Creswell & Creswell, 2017). Semi-structured interviews were conducted to gain an understanding of the current challenges and user needs. The interview data were analysed using thematic analysis to inform the design objectives and ensure the artefact addresses real-world user requirements. More details about the data collection and analysis methods are presented in the following sections.

3.2 Research process

The study was conducted within a seven-month period between April and October 2025. The timeline of the process is presented in Figure 4. The process began with discussions with the client organisation (Softwave) and familiarisation with the field, and the specific focus on the study. Based on this, a research plan was created to outline the objectives and structure of the work.

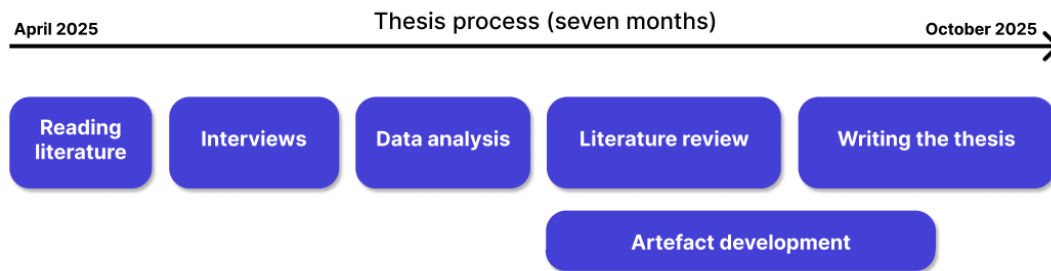


Figure 4. The timeline of the thesis process.

User interviews were conducted early in the process, as it was important to understand the users' perspectives in order to identify relevant goals and issues related to the current product. At the same time, a literature review was initiated, focusing on topics of data-driven municipal management, usability, and digital nudging.

Once all interviews were completed, the data were analysed using thematic analysis. This provided a structured and detailed understanding of user needs, challenges, and expectations. Based on insights from both the interviews and the literature, a clear direction for the design work was established. This made it possible to also finalise the theoretical background in alignment with the key themes relevant to the selected focus.

Following this, the artefact development began. The user interface was designed based on the identified user needs and challenges, as well as the theoretical insights on usability and nudging principles. Feedback was collected from the client organisation, and the design was improved accordingly. The next natural step would have been to evaluate and iterate the design, but this would have exceeded the scope of this thesis. Instead, recommendations for testing the redesign are discussed and given in Chapter 6.

Finally, the results and insights were compiled into this master's thesis. The design choices were presented with a design rationale to explain the

reasoning behind each choice in the redesign. The outcomes were also presented to the client organisation to support their ongoing development work.

3.3 Qualitative semi-structured user interviews

Qualitative methods were chosen as the basis for collecting data in this study, since the goal was to gain a deeper understanding of users' thoughts, experiences, and needs. Qualitative inquiry is particularly well-suited for this, as it aims to explore meanings, capture personal perspectives, and understand the contexts in which people operate (Patton, 2014).

Within this qualitative approach, the primary data collection method consisted of semi-structured interviews with the system users. This method was chosen because some relevant issues had already been identified prior to this study, which provided a basis for discussion. At the same time, the semi-structured format allowed for the exploration of previously unknown issues, deepening of understanding, and clarification of responses (Wilson, 2013). In total, empirical data was collected through seven (7) semi-structured user interviews. Other forms of input, such as informal feedback from the client organization, were also utilised during the iterative development of the redesigned UI. However, this feedback was not treated as a formal data collection method in this study. Instead, it functioned as part of the design and refinement process and is therefore discussed more in the Chapter 5.

Semi-structured interviews were chosen as the main method for data collection, as they are suitable for gathering both factual and interpretative insights. They are particularly useful in situations where the interviewer already has a relatively clear understanding of the relevant topics but still wants to allow participants to raise new and important issues. This combination of structure and openness makes the method good at exploring user goals, understanding attitudes, and addressing complex topics that may not be revealed

through more fixed formats. (Wilson, 2013.) This interview method aligned well with the aim of gaining an in-depth understanding of users' goals and frustrations, while still maintaining enough consistency to allow better comparison during the analysis phase. DiCicco-Bloom and Crabtree (2006) point out that this approach is especially effective for understanding how people navigate and interpret real-world situations, as it puts the participants' own perspectives and experiences at the forefront.

The interviewees were selected using purposeful sampling, meaning they were chosen based on their role and experience with the JT product. The goal was not to generalize to a larger population but to gain insights from participants who could offer "information-rich" perspectives on the use of the product in their municipalities, and therefore, purposeful sampling was chosen. (Patton, 2015.) Seven participants from Finnish municipalities were interviewed: three (3) financial directors, two (2) financial controllers/planners, and two (2) IT managers. These roles were chosen because they are typically responsible for supporting the product's implementation and use. As key users, they are the ones often consulted by others in their organization when problems arise and thus have the broadest perspective on how the product is used across different user groups. In this sense, they act as a valuable "window" into the overall user experience within their municipalities. The participants work in small (under 10,000 residents) and medium-sized (10,000-50,000 residents) municipalities, and their experience with the product varied from recently onboarded users to those with long-term use. Of the fifteen individuals contacted, interviews were scheduled and conducted with seven. The overview of the interview participants is presented in Table 2.

Participant	Role	Municipality size	Experience with the product
1	Financial manager	Medium	<1 year
2	IT manager	Medium	<1 year
3	Financial planner	Small	2+ years
4	Financial manager	Medium	<1 year
5	Financial manager	Small	<1 year
6	IT manager	Medium	1-2 years
7	Financial controller	Medium	2+ years

Table 2: Overview of the interview participants

The interview questions were primarily designed based on the information gathered from the client company. The questions were reviewed and validated by both the thesis advisor and a person from the client organization. The interview invitations included a brief description of the topics to be discussed. The interview guide made was used to support discussions, but as the interviews were semi-structured, the original set of questions was not followed strictly.

The main objective of the interviews was to explore the needs and challenges municipalities face in relation to data-driven management, also in the context of the JT product. The client organisation noticed the user activity remain low and suspected that issues with the UI might be part of the reason. To help redesign the UI, the interviews started by looking at the bigger picture of data-driven management in municipalities. For instance, what needs, goals and challenges do the interviewees deal with each day? This helped to ground the discussion before moving to the JT product itself. The interviews also explored the tasks users try to complete with the product and how well the current interface supports those needs. The interviews were directly designed to address the RQ1:

RQ1: What specific challenges or tasks do users hope to address with the product, and what usability issues hinder their current experience?

Identifying these issues was meant to inform the development of an improved UI. One that would genuinely meet user needs.

The interviews took place in May and early June 2025 over Microsoft Teams. Each session was scheduled for 60 minutes. They were held in Finnish, as it was both the native and primary working language for all participants. Microsoft Teams was used to record the sessions, and its automatic transcription feature was used to generate the initial transcripts. These were then reviewed and manually corrected by the researcher to fix the errors. The total data consisted of around 300 minutes of audio recordings and 150 pages of transcribed material. Unfortunately, one interview recording was cut off for unknown reasons about 20 minutes before the end. For this portion, written notes done straight after the interview were used. Verbal consent for the interviews, recording, and data handling was obtained at the beginning of each session.

3.4 Thematic analysis of interviews

The primary method for analysing the interview data was thematic analysis, with the goal of identifying insights to guide the development of the artefact. It is a flexible and widely used approach that identifies and interprets patterns, or so-called themes, within the qualitative data (Braun & Clarke, 2006). This method enables both structure and flexibility to explore the user needs and issues and therefore gives valuable insights to inform the UI redesign. It was also chosen because it supports an inductive, data-driven approach and allows for both surface-level and deeper interpretation of user experiences, as outlined by Braun and Clarke (2006).

The analysis followed the six-step process described by Nowell et al. (2017). The process included getting familiar with the data, generating initial codes, searching for themes, then reviewing, defining and naming them, and finally producing the report. Coding was done manually using Google Sheets. After all interviews were coded, similar ones were grouped into categories to help structure the data. These categories were then merged into four final themes that reflected emerging topics of the interviews. The whole process was iterative, as the codes, categories, and emerging themes were reviewed multiple times. This ensured that the results were coherent and aligned with the research objectives.

This study applied an inductive approach to thematic analysis. This means that the themes were developed directly from the data rather than based on pre-existing theoretical concepts (Nowell et al., 2017). The goal was to let the participants' perspectives and experiences guide the direction of the analysis, not to test any hypothesis. In terms of analytical depth, the analysis focused on a latent level. This means it tried to look at the underlying meanings and beliefs behind what is said, not just the explicit content mentioned (Braun & Clarke, 2006). This was important because, as Nielsen (1993) highlights,

users are unable to fully recognize or articulate the usability issues they experience, as they are not trained to analyse interfaces or articulate what makes them feel something. Thus, the researcher's interpretation was important in uncovering understanding related to the design of the system. This way, vague or implicit feedback was sort of translated into possible development directions.

3.5 Artefact development

The main objectives of this study were to understand municipalities' needs and challenges in data-driven management and to create a redesign of the JT system's UI that addresses these needs. The interviews help to clarify the objectives for the solution, while the redesigned JT serves as the artefact in the DSR process. Relevant literature and insight from the thematic analyses were used to create design objectives for the solution to guide the development phase. The artefact was then developed in alignment with design objectives, as well as with the feedback from the client company. The purpose of this process was to produce an artefact that supports municipalities in their data-driven management practices and addresses the identified usability issues. This design process and justifications of choices are presented in more detail in Chapter 5.

3.6 Ethical considerations

Ethical factors were carefully considered throughout the entire research process of this study. The interviewees were informed about the purpose of the study, the confidentiality of the interviews, and how the data would be used throughout the process. The participants were explained that the thesis was conducted for the client company with the goal of supporting the development of their JT product. They were also encouraged to ask questions and raise any concerns during the interview. The possibility to contact the researcher with additional thoughts or concerns was also mentioned at the end of the discussions.

Each interview started with obtaining the informed consent verbally from the participants. They were reminded that taking part was voluntary and that they could answer questions as briefly or broadly as they liked. The responses would be anonymised, so neither individuals nor organisations would be identified in the final report. Participants were informed already in advance in the invitation that the interviews would be recorded.

To ensure privacy and confidentiality, all interview data were anonymized in the transcriptions. No material that would allow recognising either the participant or organisation will be shared. The data is stored securely in a personal cloud storage protected by the researcher's credentials, with access restricted to the researcher only.

As with all qualitative research methods, the researcher takes an active role in interpreting the data. Therefore, it was acknowledged that the potential for bias exists. Therefore, the approaches and methods used in this study are presented here as transparent as possible.

4 Results

This chapter presents the main findings from the user interviews. The goal of the interviews was to explore the users' needs, challenges, and experiences with the current system in order to answer RQ1: *"What specific challenges or tasks do users hope to address with the product, and what usability issues hinder their current experience?"*. Based on the analysis, four key themes were identified. These themes help to highlight what users are trying to achieve with the use of the JT, what influence their motivation and adoption of the system, and what issues they face in its use. Each theme is further divided into categories and some quotes from the participants are included to support the findings. The quotes included are translated from Finnish and used to illustrate the participants' views and experiences in their own words. The way these findings informed the UI redesign is discussed in detail in Chapter 5.

4.1 Needs for data-driven management

The interviews highlighted a shared need among all participants to strengthen data-driven management in their organisations' everyday work. Although data is already available in their environment, participants felt it is not yet supporting decision-making to the extent they would hope for.

They described various needs related to how the use of data could help support decision-making, collaboration and common goals across the organisation. These categories reflect the participants' views on what is needed in their organisations to make the use of data more meaningful and efficient.

Data-informed decision-making

Participants expressed a clear need for decision-making in their organisations to be more strongly supported by data. They felt that decisions are still

often based on experiences or assumptions, and there is a potential to rely more on factual information.

There is also an aim to move toward more forward-looking, proactive decision-making. Instead of only reacting to current situations, participants hoped that their organizations would anticipate future developments more. A few mentioned an interest in utilising AI tools to support forecasting based on existing data. As one interviewee stated:

“It should be possible to look ahead using current data and knowledge, to anticipate developments and make well-grounded decisions based on that.”

To support this kind of decision-making, participants emphasised the importance of having efficient tools for sharing data across departments and boards. They felt that data should reach the people who make any kind of decisions, and support more informed decision-making at all levels of the organization.

Financial and operational performance monitoring

Participants highlighted the importance of regularly following both financial data and operational performance. They felt that especially financial tracking should be a shared responsibility across the organization, not limited just to leadership roles. Everyone should take responsibility for being aware of and influencing their municipality’s financial situation.

Statistical data also plays an important role in their work, offering useful information and support for planning. Many like to check statistical data from JT instead of Statistics Finland, as they feel it is easier to find from JT. Multiple participants also mentioned it being helpful to compare their

organisation's data with other municipalities in JT, as it provides useful points of reference.

Data processing and reporting

Interviewees described what kind of needs there are to analyse and process data in their organisation. It is often analysed to some extent, sometimes in a light and sometimes in a more systematic way. Some participants wished there were better tools to support analysis. They saw that AI could assist in data analysis, especially for those who are less familiar with it. Data is also frequently shared in presentations and meetings, and the ability to drill down into the data was considered useful.

Reporting was mentioned to be a central part of the municipality's work and responsibilities. Participants felt that mandatory reporting is probably the biggest motivator for people to examine the numbers and the meaning behind them more closely. As one interviewee put it:

“People get activated when the moment comes that some kind of consensus or report needs to be created.”

Common understanding and goals

One of the key benefits of data-driven management, according to participants, is its role in supporting shared goals across the organization. Tools like JT can help communicate and remind people of these goals and keep them visible in everyday work. Interviewees wished that these tools could help everyone speak the same language and follow the same priorities. As one interviewee explained:

“In the final year of the last council term, not everyone even remembered what our financial goals were. If this could help us speak a common language and follow the most important things together, that would take us a long way.”

Organizational goals are set at the beginning of the four-year council term, and they are meant to remain relatively stable throughout that period. Participants emphasised that long-term goals need long-term monitoring to stay on track. As one person put it:

“Our core goals are quite stable. Otherwise, we won’t know if we’re moving in the right direction or not. You can’t change the goals every year.”

In addition to internal use, data sharing can also support transparency by making the financial situation and progress visible to citizens.

Data centralization

One of the recurring needs mentioned by participants was having data available in one place. Municipalities use dozens of different systems for storing and processing data, which makes it difficult to get a clear overview. Having all key data under one platform makes everyday work easier and more efficient.

When data is located within the same system, it becomes easier to combine information from different areas, such as education and IT. This enables more in-depth analysis and helps build a more complete picture of the organization. As one interviewee explained:

“They probably don’t use or combine data that much in their own management, but they could, if it were all brought together in one place.”

Another highlighted the potential for automation:

“Sure, we can do the calculations now too by digging out the data manually, but it would be so much more convenient if we could actually get all the outputs into one place, where the calculation could also be more automated.”

Participants also emphasized the importance of everyone using the same up-to-date data. When everyone uses a single source of information, it supports shared understanding and reduces the need to explain differences. As one interviewee said:

“One source, one data. Whether it is right or wrong, at least everyone has the same one. That really reduces the amount of explaining, and that’s super important.”

Data centralization was also seen as important for reporting. When reporting tools are part of the same product family, as the Opiferus product family has, it is very useful and fast to bring metrics from JT to the reports. As one participant demonstrated:

“We pull content directly from the management dashboard [JT] into our financial documentation [part of Opiferus]. We already have ready-made charts there that we pull to financial documentation, and this is something we want to do even more in the future.”

However, participants hoped that different Opiferus products would work together even more smoothly. They saw that integration between systems could be improved and made easier to understand how data flows between them, and how they can be used together to get the most out of them.

Efficiency

The final category that emerged under the theme of data-driven management related to efficiency. A clear need that arose was to save time and reduce manual work in their daily tasks. They appreciated systems like JT that could handle part of the routine work, such as collecting and calculating key figures, so that they wouldn't need to spend time searching for the right information or create all the metrics manually.

Fast access to data was mentioned as one of the main benefits. When information is available in one place and it is easy to find, it supports quick information retrieval in everyday situations. Many participants said they use JT specifically for this purpose. Practical examples were given:

“I’ve started using it more often. For example, yesterday during a council meeting someone asked about our sick leave numbers, and luckily, I had the JT opened, so I quickly surfed through it and showed the information to them.”

“I often use the indicators there, like if someone suddenly asks what our population number is or something like that, I know the fastest way to find it is from there.”

In addition to quick searching, participants also valued the ability to get a general overview without having to dive deep into the data or scroll too much. As one user put it:

“The greatest value is that the JT tool makes it possible to get an overall picture of different areas quickly.”

In bilingual municipalities, efficiency also includes language-related needs. If the same translations can be reused across different tools, such as data management and reporting, it reduces extra work and helps streamline processes.

In summary, participants shared a strong interest in improving data-driven management within their municipalities. While data is already present in their work, they see opportunities to make its use more effective, meaningful, and accessible. The needs they described cover many aspects, like decision-making support, performance monitoring, data centralization, and overall efficiency. Together, these needs reflect a desire to build more data-driven practices that help align goals, save time, and support better decisions at all levels of the municipality.

4.2 Adoption and motivation

The interviews revealed that there are clear challenges in the adoption and everyday use of JT across municipalities, as was expected. While the tool is in active use by some interviewees, they felt that the broader rollout has not yet succeeded as hoped. Many described a lack of motivation and ownership among those who could be using the system more actively, especially across departments and among decision-makers.

At the same time, there is a strong desire to expand the use of JT and promote a more data-informed culture across departments and boards. Participants highlighted what barriers are limiting wider use and what kind of actions could help strengthen the adoption. The following categories explain the intended goals, the reasons behind low motivation, and some potential ways to improve commitment and encourage more active use that was mentioned.

JT for departments and boards

Nearly all interviewees expressed a clear goal or wish to expand the use of JT across the municipality. Their aim is to involve a wider group of users, especially those in any kind of cost management roles or in department or board leadership. This goal is driven by the multiple benefits of data use described in the previous theme, as well as in the following category: benefits that become even more valuable when the entire organisation is on board. As one interviewee stated their motivation:

“I have a clear goal myself: to roll out the JT indicators to our department leaders.”

Among the interviewees themselves, JT was already in frequent use for most. Many mentioned using it weekly or even daily. These active users serve as examples of how the tool can support decision-making in day-to-

day work when it is fully integrated into their routines. Their usage habits reflect the level of engagement that municipalities aim to achieve more broadly across departments and roles.

Commitment to budget

Most interviewees described how growing financial pressure has increased the importance of getting more people involved in following the municipality's finances. They noted that when budgets are tight, it becomes easier to introduce and justify financial tracking across the organisation, as no one can ignore or avoid the issue. As some participants put it:

“In this financial crisis, it’s been easier to bring finance into focus across the organization. No one can really say it’s not their concern or we don’t really think about it.”

“Finance is now the driving force. We’re facing a massive deficit again next year, so everyone must check the numbers daily just to see what’s happening.”

Participants hoped that tools like JT would support stronger engagement with budget and financial data, especially among those responsible for cost management. They felt that making financial information more accessible increases ownership and supports more responsible decision-making. One interviewee gave a concrete example of how consistent tracking had already changed behaviour:

“We’ve been tracking FTEs [full-time equivalent] for a year now and learning how to deal with overruns. And now it’s starting to show. I feel like we are now more aware of how many substitutes we use, and the FTE number has clearly gone down because of this.”

Management motivation

What was widely agreed on is that the bigger barrier to wider adoption of JT is not really its technical features, but cultural factors within the municipalities. Participants felt that leadership plays a crucial role in promoting the use of data tools and setting an example. Without visible support and engagement from managers, adoption among others is unlikely to take root. And this was not yet seen as having succeeded. As one interviewee put it:

“The biggest barrier to use isn’t technical, it’s cultural. Leaders must want to and remember to roll the tool out.”

It was emphasised that managers and department heads need to be personally committed to using the system themselves, not just supporting it in principle. Without that ownership, the system may be seen as something optional or external to everyday work.

“You have a good system, but your organization just isn’t ready yet. It’s the question of which comes first: the system or the process.”

Participants also highlighted that strengthening leadership engagement might require broader organisational change and possibly more support through training and internal advocacy. Change agents and internal “nudgers” were seen as helpful in challenging the current culture and encouraging more active use.

Lack of ownership and competing tools

One of the key reasons JT is not yet more widely used is that many employees in the organisations do not view data monitoring as part of their own role. Interviewees described a tendency among staff to wait for someone else, often leadership or administration, to point out if something in the data requires attention. The idea of regularly checking data and drawing conclusions

independently was not yet embedded as part of everyday work in all departments. As one participant described, encouraging people to engage with data often requires prompting and nudging:

“I’ve had to act as kind of instigator in the field, pushing people to discuss that ‘now that you see the situation, what is your conclusion? What does this mean to you?’”

In addition to this cultural gap, many departments rely on their own systems and data sources to follow up on the indicators relevant to their work. These systems are familiar and often considered sufficient for their specific needs. For example, schools track teaching hours through their own student information systems, and other departments follow their own metrics using their sector-specific tools.

“They probably do follow their own data. For example, schools track their hours through the student and school system.”

Some interviewees noted that individuals don’t always see the value in bringing their operational data into a shared environment like JT, as they themselves already have access to it elsewhere. However, the broader organisational benefit is clear: centralised data would improve coordination and understanding, but the personal incentive to contribute is not always felt.

“Unfortunately, some departments still think: ‘why should I put effort into moving this data elsewhere?’ They say that ‘you can just ask me if you need it’.”

Building routine through support and reminders

One of the most frequently mentioned ways to strengthen the use of JT in the whole organisation was to incorporate it into existing meetings and

shared review practices. Participants highlighted the importance of regularly sitting down together, whether it's in leadership teams, departments or unit meetings, and to go through the current data, discuss changes, and reflect their meaning. This kind of shared review was seen as a practical and effective way to bring data into everyday decision-making.

“We should do more to develop the habit of sitting down together and going through the data.”

Some participants also shared ideas on how this kind of use could be made easier. One suggestion was to create a ready-made template or reporting models to support the discussion in meetings. These templates could help with interpreting the data.

“It probably means that I’ll also create some kind of ready-made format for the introductory text, where you should at least state these things: that sales revenue has increased, briefly, in three bullet points. Why have costs increased, in three bullet points. And nothing more, so that it remains short and concise, allowing decision-makers to easily find key points in the report.”

Another interviewee envisioned using JT views directly in board or council presentations, assuming the right kind of views exists:

“I’ve been thinking that I could present through that [JT] to the board and the council in the future, if there are views like that in place so I can show the financial situation from there.”

However, building new routines and long-lasting engagement takes time and repetition. Participants noted that JT has sparked interest, but without ongoing encouragement, its use has faded. They mentioned that regular

reminders and active encouragement could help build the habit. As one person described:

“There is always that reaction like, wow this looks really good, looks great, and people get excited. But somehow it still hasn’t found its place where it would truly, genuinely be part of things.”

Several interviewees also pointed out that some users simply forget to check the data unless someone reminds them, or they wait for others to highlight problems. In some cases, active support from a colleague is needed to build a habit:

“They do know how to immediately draw conclusions about what it [some data] means, but when I come back next month to ask again, it’s kind of like starting over. In a way, it requires that I go alongside them hand in hand for a while.”

Overall, participants agreed that support, repetition, and structure were key to turning occasional use into lasting routine.

4.3 Data understandability

The third theme that emerged from the analysis was that making data available is not enough. It needs to be easy to interpret. The interviews highlighted how clarity, presentation, and cognitive load of the data all play a big role in how successfully it supports decision-making in municipalities.

Many praised JT’s strengths in visualising data and showing source information clearly. However, they also pointed out challenges such as the overwhelming amount of information and varying skill levels among users. These

categories illustrate what aspects make data more understandable, and where further improvements could support better adoption.

Visual presentation

One of the most frequently mentioned strengths of the JT tool was its visual and graphical presentation of information. Participants highlighted that graphical elements make complex data easier to understand and quicker to interpret, especially when there's lots of it. Graphs and charts were described as an effective way to summarise key figures without overwhelming the user. As one interviewee put it:

“The great value [of JT] is that there are various nicely summarised, well-constructed graphs, for example, about unemployment or population changes... You don't need to look at a long Excel or a huge amount of numbers, but they are visually well presented, so you get the picture quite quickly. We are all a bit too busy for more than that.”

Others echoed similar sentiments:

“What's nice in Opiferus is that the graphs are pleasant. They illustrate things well, which is a really good way to present this information.”

“This kind of light and visually pleasant information is just really nice overall.”

In addition to visuals, some participants also briefly noted about the explanations for the indicators. While some said that the info boxes currently available in JT work well, others hoped for more flexibility. For example, the option to add notes alongside the data could help clarify the meaning or context of a particular metric when needed.

Data source transparency and timeliness

Although mentioned briefly, several participants emphasised the importance of knowing where the data comes from and being able to trust its accuracy. They appreciated that in JT, the sources of the figures are often visible and accessible through links, making it easier to understand what lies behind the numbers. Some also mentioned that they often use these links to dig deeper into the original sources, for example checking the more detailed data directly from Statistics Finland through the link when needed.

Up-to-date information was also valued. Interviewees noted that having data that is automatically updated reduces manual effort and builds confidence in using the system as a reliable source.

People from diverse backgrounds

Interviewees highlighted that the users of JT come from a wide range of professional and educational backgrounds. There can be department managers with strong financial data to elected representatives with possibly no prior experience in working with this kind of data. Because of this diversity, the data and indicators in JT must be easy to interpret and easy to find and access within the system. As said:

“We have representatives from all kinds of backgrounds. Some know everything about data analytics, but then there’s a home daycare provider, an HVAC installer, a professor... It’s a huge range. The data needs to be easy to approach for everyone. And there should not be too much of it.”

Some also emphasised that not all managers feel comfortable interpreting financial data. Especially those unfamiliar with Opiferus Financial Document tool, the JT interface needs to be extremely simple and clear, enabling users to quickly locate key figures and assess how their unit is performing.

“Some supervisors that are not so familiar with financial stuff get headaches when they should to go to the [Opiferus] Financial Document. So, I think the financial indicators in the dashboard [JT] should be very, very, very simple. Just something that shows at a glance whether things are going well or badly and if there is budget left or not.”

In addition, participants noted that those who are not closely involved in daily operations of the municipality, such as board members, often face a steep learning curve. They are expected to absorb a large amount of new information in a short time, often during council meetings, without the benefit of working with the data in their daily roles. This makes it particularly important that the data is easy to understand and interpret at a glance.

Amount of information and cognitive load

While interviewees acknowledged that JT has improved in recent years, they still felt that the amount of information presented at once can be overwhelming. Several participants noted that the system has become simpler and more digestible due to its visual outlook:

“Fortunately, the product development team at Softwave has done a good job as they’ve created those infographics and got the front page simplified so it doesn’t hit you in the face right away.”

Nevertheless, the level of simplicity has not reached the desired level yet, according to the interviews. The desire to have only the most essential data visible was repeated across many interviews. It was pointed up that showing too much at once can easily discourage users from engaging with the tool. The cluttered appearance may push people away rather than inviting them to explore the content further. What was said:

“Like now, when I look at our front page... We should really consider what is actually relevant and interesting, so that someone else would care about it too and it’s not too heavy.”

“If you first learned to read one graph and then another would come later, and so on... so you wouldn’t get that information overload. That’s probably one very key point too.”

“If you open it up and you see everything, you immediately feel like, I’m going to close this, this isn’t for me.”

What was often raised was the point that the most meaningful use comes when focusing only on a few key indicators that truly reflect what the organisation wants to track instead of trying to show everything. Users need clarity, not quantity.

“And that’s exactly what it’s like right now with these systems. You have to challenge them and ask: Why are you collecting so much? If you had to pick out of this set of 10, which are the ones you actually follow? And when you push them, they usually say: Well actually, there are these 2.”

Some mentioned that the default view should focus only on the most essential numbers, while the existing drill-down functionality can then be used to explore more detailed data when needed, for example when wanting detailed information about specific age groups or target areas.

At the same time when this need of simplicity was highlighted, interviewees expressed a wide range of needs when it comes to indicators. Each mentioned a slightly different indicators, like environmental targets, loan data, national statistical data or well-being indicators. This shows what is considered

“essential” can vary significantly depending on the municipality, user’s role and perspective.

4.4 System usability and learning

The final theme formed is about the system’s usability and learning. All interviews revealed thoughts or experiences on how easy or difficult the JT system is to use in practice. Some directly described features they found helpful or challenging, while others revealed issues more indirectly. For example, features they had avoided or unexplored, or had uncertainty about how to get started, are likely to indicate that either they don’t match user needs or they are not user-friendly enough.

Overall, participants emphasized that adopting JT requires some time and support. Although the system is seen technically stable and accessible, it has not yet become a natural part of daily routines for most users. Some felt the system was designed more with technical considerations in mind than with a user-centred approach. The following categories present key observations related to overall sense of usability, technical accessibility, and the advanced features that were seen as particularly difficult to use.

User-friendliness and onboarding

Participants had mixed experiences regarding how user-friendly they experienced JT. Some described the interface as intuitive and easy to use, especially after getting more familiar with it. However, others pointed out that the system seemed to reflect a very technical approach rather than a user-centred one. They felt that the product would benefit from clearer logic, simplification, and overall improvements of the user experience to better support the less technical users.

One participant compared JT to Google's tools, which they perceived significantly more accessible and intuitive to use. They had noticed a gap between more consumer-oriented tools and the JT, especially when switching between them in their daily work. As one person put it:

"Now that Google is appearing next to our internal tools, I have to start justifying why we even have this system, when I can get the same thing from here with one click."

Some also noted that if the technical users already find the interface confusing, it was unlike that less tech-savvy users would want to try to engage with it. Others compared JT to Opiferus' Financial Documentation tool, which was described as easier to use and more widely adopted in their organization.

Interviews revealed that people felt that JT is not something people can just start using without some effort. They felt the system requires a learning period, guidance, and repeated use before it becomes part of everyday routines. A few said that they had not yet had the time to figure out what they want from the system or how to configure it to fit their needs best. There was also a sense that leadership must first agree on shared practices before any broader adoption can take place:

"The management team, the extended team, or whoever sits in those meetings, they first need to find consensus on how the system should be developed and how it should be used."

A few described that some tasks could feel difficult to accomplish without external help. While the system offers a range of features, users sometimes found themselves needing to ask for support from Softwave, as the interface does not always guide them clearly. As one interviewee put it:

“Managing integrations has sometimes been a topic of discussion among us, that why does it cost money. I understand it in a way, but then again, those basic things should really work without needing billable help every time.”

Some mentioned that their teams were still on a *starting line* when it came to working with JT and didn't yet feel confident using it actively. Especially with high staff turnover or limited time, adoption had been slow.

Related to this learning curve, some users also mentioned having slight difficulties with navigation. At the beginning the interface had been hard to navigate. While this had improved and they had learned, certain areas, especially those with complex organizational tree structures, were still experienced as confusing by less frequent users.

Technical accessibility

Positive feedback was given about the technical functionality of JT. The system was seen as reliable, with few reported technical issues or downtime. A commonly praised feature was the ease of access through single sign-on and browser-based use, which was said to lower the bar for logging in and checking data quickly:

“The technical accessibility is easy, and that lowers the threshold to go there.”

In addition, a few interviewees highlighted the benefits of being able to work on documents collaboratively online, regardless of users' location.

Advanced use

Some features in JT are intended for slightly more advanced and active users. These features include things like building custom indicators, importing

external data, and exploring detailed views with data drilling. Although these features add value, they were described as relatively difficult to use, and often requiring a higher level of technical understanding or support from others.

One often mentioned challenge was importing and integrating data from external sources. Even though this is relevant only to a rather small group of advanced users, the process was described as difficult to understand and hard to manage independently:

“When it comes to bringing in data... once you get to the part where you have to look under the hood, there’s a real gap. We had this nice idea that main users would take more responsibility on that, but I have to admit, even I found it tricky. So I can only imagine how it feels for our main users, who aren’t ICT people at all.”

The ability to create one’s own indicators or dashboards was also mentioned often, but many said that these features had been often left unused. Some users had hoped for more training or described the interface as confusing due to the large number of options and unclear terminology.

Drill down, a feature that allows users to explore more detailed layers behind the main indicators, was considered a powerful tool, but often forgotten or underused. Users said the function wasn’t always easy to discover or felt too technical. There was a wish that drilling would become more intuitive and approachable for a broader user base:

“When you drill down, the question is, whether it is designed for the engineer who coded it, or the everyday user who is just interested to see a couple of numbers more. The user interface kind of hits you in the face across the board.”

“What comes to mind are tools like Power BI... couldn't it work so that when you click a bar, it would automatically drill deeper? That would make it more usable.”

In addition, some active users, especially those who work in financial administration, expressed a need for a deeper data processing or more advanced customization options. They reported that for certain tasks, such as municipal comparisons or invoice-level drill-down, they relied on other software products that allowed more flexibility that JT currently offers.

In summary, the results reveal that municipalities share a strong need to strengthen data-driven management. However, the adoption of JT remains limited due to low leadership motivation, unclear responsibilities, and usability barriers. While users value the availability and visualisation of data, challenges related to information overload, navigation, and learnability reduce the system's usability and engagement. How these findings are translated into concrete design responses is discussed in the next chapter.

5 Artefact development

This chapter presents the design of the artefact. The chapter follows the principles of DSRF outlined earlier in the Methodology chapter and emphasises both the planning and construction of the solution to the identified problems. The next natural step would be to empirically evaluate the artefact, but this falls outside the scope of this thesis. However, recommendations for future evaluation are discussed in Chapter 6.

By presenting and justifying the design of the artefact, this chapter also directly addresses the main research question RQ2. By grounding the redesign in both empirical findings and theoretical knowledge, the artefact demonstrates how the JT can be adapted to better support municipalities in their data-driven management practices.

This chapter is divided into two main stages. Section 5.1 describes the planning stage and clarifies the scope and objective for the design. Here, we also combine the main findings from the interview analysis and the literature into concrete design objectives, that are then used in the artefact development phase. Section 5.2 then presents the artefact, in which the key design choices are described and justified. Each key choice is discussed in relation to the design objectives and guiding design principles.

5.1 Planning stage

This planning stage connects the findings from the interviews with the literature for the design of the artefact. The purpose here is to define the scope of the redesign, clarify which user groups are in focus, and outline the objectives that guide the development of the artefact. In addition, design principles drawn from the background literature are introduced to guide the design choices.

5.1.1 The scope and focus user groups

The artefact of this study is a redesigned UI of the JT product. The purpose of the redesign is to design a UI that directly responds to the identified goals and challenges, increasing the user engagement with the system. This redesign answers to the research question RQ2: *“What type of user interface design would address the identified goals and challenges, and improve user engagement?”*

The scope of the artefact development covers the improvements in the UI design and some features that influence how users experience the product. The focus is on how the information is presented, how users navigate within the system, and how engagement can be supported. The redesign mainly consists of front-end UI improvements. However, some proposed features require development in the back-end logic, and these were discussed separately with the client company to make sure they align with their development plans. In addition, one nudging method outside the UI was introduced and similarly validated with the company.

The JT system has a wide potential user base in municipalities, from financial leaders to daycare managers and other employees involved in decision-making. The active users, such as financial directors and IT managers, were interviewed for this thesis, as they currently use the system most and provided valuable insights into existing challenges. However, the redesign was chosen to target other user groups. The first user group in focus is other managers and department leads, who play a key role in bringing data into meetings and encouraging others to follow financial data and commit to the budget. They were chosen because their influence is critical for adoption and wider use of the system. The second focus group is the broader base of municipal employees involved in municipal decision-making, such as daycare managers, school principals, or employees from employment services. These users are not yet engaged at the desired level, so their needs were placed at the centre

of this redesign. Overall, the aim was not to optimise expert use, but to lower barriers for managers and the wider employee base, thereby supporting broader adoption.

5.1.2 Design objectives

The interviews revealed several recurring needs and challenges that hindered the effective and pleasant use of the JT system. These findings were grouped into seven design objectives that guide the redesign of the UI. Each objective synthesises related categories from the thematic analysis and translates them into concrete goals that the design aims to achieve. The seven objectives are:

1. Strengthen monitoring and commitment to budget

Encourage users to follow budgets and performance indicators as part of their daily work to build a shared understanding of common goals and commitment to budget.

2. Bring data into meetings and decision-making

Support managers and meeting leads in actively using JT data as part of collaborative discussions and decision-making processes.

3. Increase engagement

Motivate users to return to the system and use its features through activation and reminders.

4. Ensure usability

Provide an interface that is intuitive, easy to learn, and accessible for users with different backgrounds and skill levels.

5. Support personalised indicator needs

Allow users to adapt the interface to their own needs.

6. Reduce cognitive load

Prevent information overload by ensuring users see most relevant data, reduce unnecessary scrolling, and help them focus on actions and indicators that help them achieve their goals.

7. Improve navigation and exploration

Enable users to find what they are looking for more easily, whether it is an indicator, a feature, or a specific section of the product.

To ensure transparency and clarity, Table 3 below shows how each objective is linked to the categories that emerged from the thematic analysis.

Design objective	Linked categories from interviews
Strengthen monitoring and commitment to budget	Commitment to budget Financial and operational performance monitoring Data monitoring not perceived as part of the job Common understanding and goals
Bring data into meetings and decision-making	Joint review of data and goals JT for departments and boards Data for decision-making Management motivation
Increase engagement	Activation and reminders Amount of usage
Ensure usability	User-friendly interface Learning People form diverse backgrounds
Support personalised indicator needs	Fragmented indicator needs
Reduce cognitive load	Amount of information and cognitive load
Improve navigation and exploration	Navigation, Data drilling

Table 3. Design objectives of the UI redesign linked to categories from the interview analysis.

5.1.3 Design principles

The redesign process is guided by the established usability heuristics and selected nudging techniques, which were presented in Chapter 2. Together, they provide guiding principles for ensuring that the interface is both user-friendly and capable of improving engagement.

First, Nielsen's ten usability heuristics are applied as general guidelines for the redesign. These heuristics act as a framework for assessing and improving usability, and make sure that the interface is consistent, intuitive, and

supports efficient interaction across different user groups. The next section highlights, for each design choice, which usability heuristics have been improved compared to the current UI.

Second, from the broader set of nudging methods discussed in the Background, five were selected for the redesign: messenger effect, status quo bias, social norms, loss aversion, and simplification. These techniques were chosen since they can be used so that they align with the identified goals and challenges of encouraging regular engagement with the data, helping bring the data into actual use, and making the use more efficient. The detailed application of each principle is discussed in the following section.

5.2 Design and development phase

This section presents the redesigned JT system. Each part of the redesign is introduced with a description and visual examples. The design choices are explained in relation to the design objectives and design principles that were introduced previously. Some decisions are also compared with the current version of the UI to highlight the improvements.

The UI mockups were created in Figma for both desktop and laptop sizes. For the client organisation, they were delivered as an interactive prototype, allowing stakeholders to view the flow and interact with the mockup to better understand and feel the proposed changes. In here however, the redesign is presented with screenshots taken from the laptop-size mockups. Therefore, the flow of the interactions is not visible in the same way as in the prototype.

The whole redesigned UI is not shown in full visual detail, as the client preferred not to disclose the entire interface publicly. Although the most important changes related to the UI are presented as clearly as possible to illustrate the key improvements.

Navigation

The navigation of the JT system was redesigned to be clearer, more consistent and easier to use. In the current version, the navigation structure was somewhat unclear, with similar sections appearing in both the top and side menus. This created unnecessary complexity and made it difficult for users to understand how the sections differed. In the redesign, the top navigation focuses on the main functions visible in every view, while the side menu now provides access to indicators and other content of the system. This also freed space in the top bar for new functions, search and notifications, which are presented later.

In the previous design, the top menu (Figure 5) contained navigation for indicator areas related to different sectors. These were moved from the top menu to the front page “*Mittaristo*” (Figure 6), as they were not visible on all pages and therefore the structure was unclear. The sidebar (Figure 6) was also simplified into subcategories, allowing users to reach their desired views more easily. In the redesign, both the top and side menus now hold only things that are visible in every view of the system.

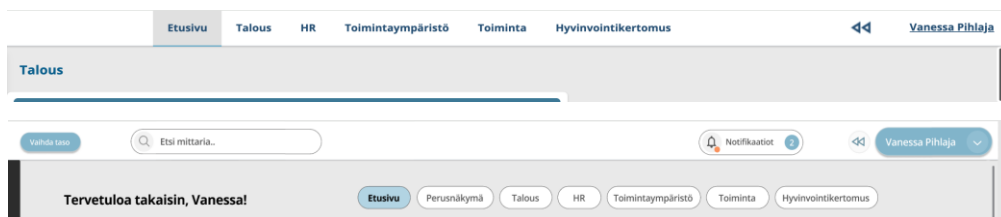


Figure 5. Above is the current top navigation bar, and below the redesigned top navigation bar.

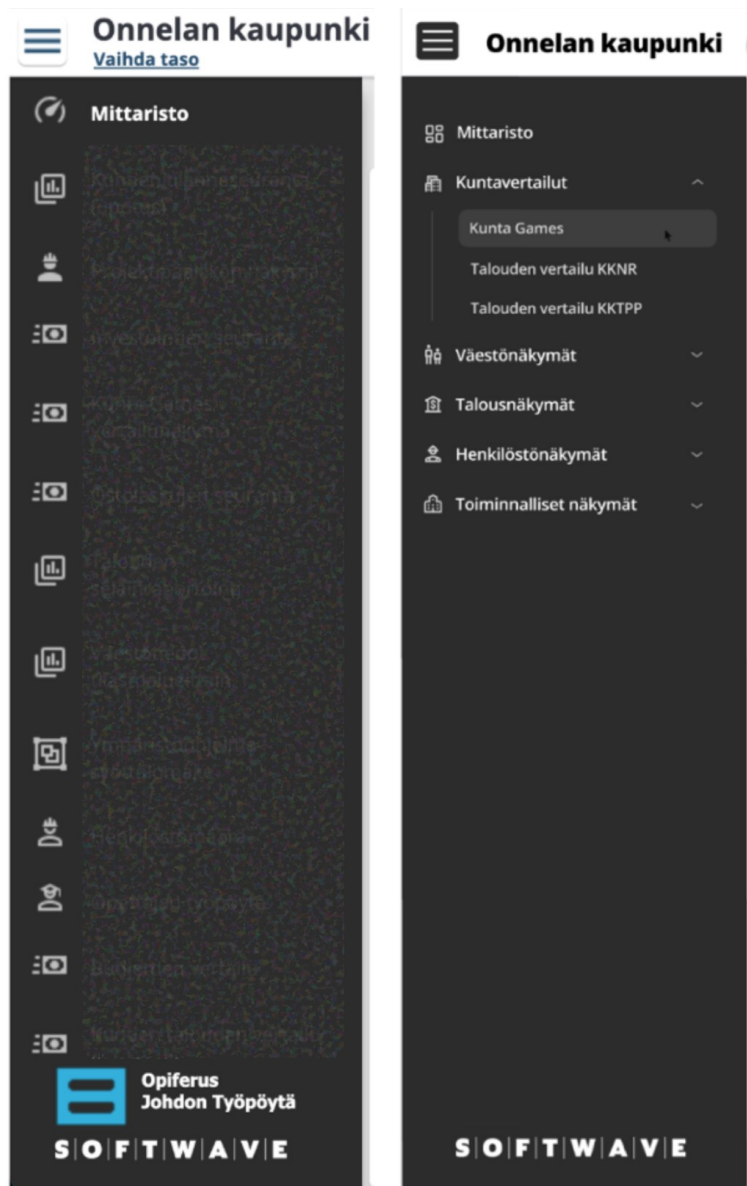


Figure 6. On the left is the current sidebar menu and on the right is the redesigned version.

These changes address the objectives of ensuring usability, reducing cognitive load, and improving navigation and exploration. They also strengthen Nielsen's consistency and standards heuristics, helping users navigate without having to recall how sections or actions differ across the system.

Search

A new search function was introduced to make it easier for users to find indicators and other content within the JT system (Figure 7). The current version does not include a search feature, which often forces users to browse through a long list of indicators to locate specific content. The addition of search was discussed with the client company, and it was clear that it aligns with their goals to expand the number of indicators available in the future.

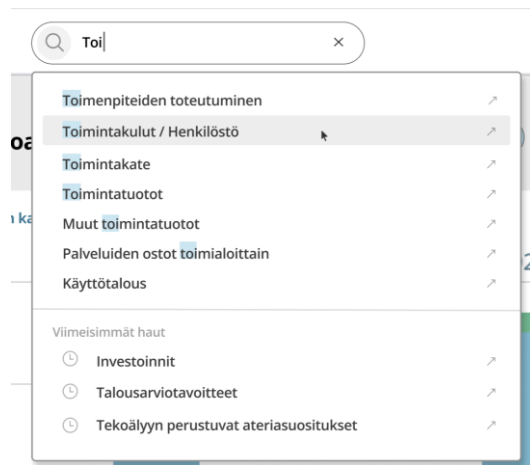


Figure 7. New search feature in the redesigned JT UI.

The feature supports the design objectives of ensuring usability, supporting personalised indicator needs, reducing cognitive load, and improving navigation and exploration. It allows users to quickly find what they are looking for without the need to memorise where a specific indicator is located. This inclusion of “*Viimeisimmät haut*” (*Recent searches*) further improves efficiency by allowing users to revisit the indicators they have searched for recently.

The redesign strengthens Nielsen’s heuristic of flexibility and efficiency of use, as well as recognition rather than recall, by enabling both new and experienced users to navigate the system faster and with less effort.

Own view

In the current version of the JT, the front page displays a fixed set of indicators chosen during the system implementation process by representatives from the municipality. These indicators were intended to represent the most relevant metrics for typical users. However, interviews indicated that users mainly follow only a few key metrics, but their needs are highly fragmented.

To better support these individual needs, the front page was redesigned to be so called “Own view”, where users can pin (Figure 8) their most important indicators. The current content of the front page still exists in the new design as “*Perusnäky*mä” (Figure 9), containing the indicators originally selected during the implementation. This approach allows users to customise their dashboard while retaining access to the standard view.

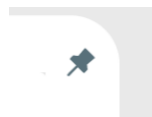


Figure 8. Pin icon in indicators used to add indicators to the front page.

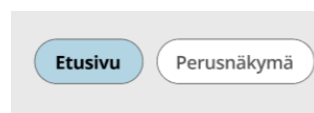


Figure 9. Buttons for switching between new front page (“*Etusivu*”) and the previous front page (“*Perusnäky*mä”).

The empty view (Figure 10) illustrates how the front page appears when the user has not yet pinned any indicators. It includes short guidance text and a button encouraging users to explore the “*Perusnäky*mä” and select indicators for their own view. This subtle prompt applies the nudging techniques of simplification by making the next step clear and effortless.

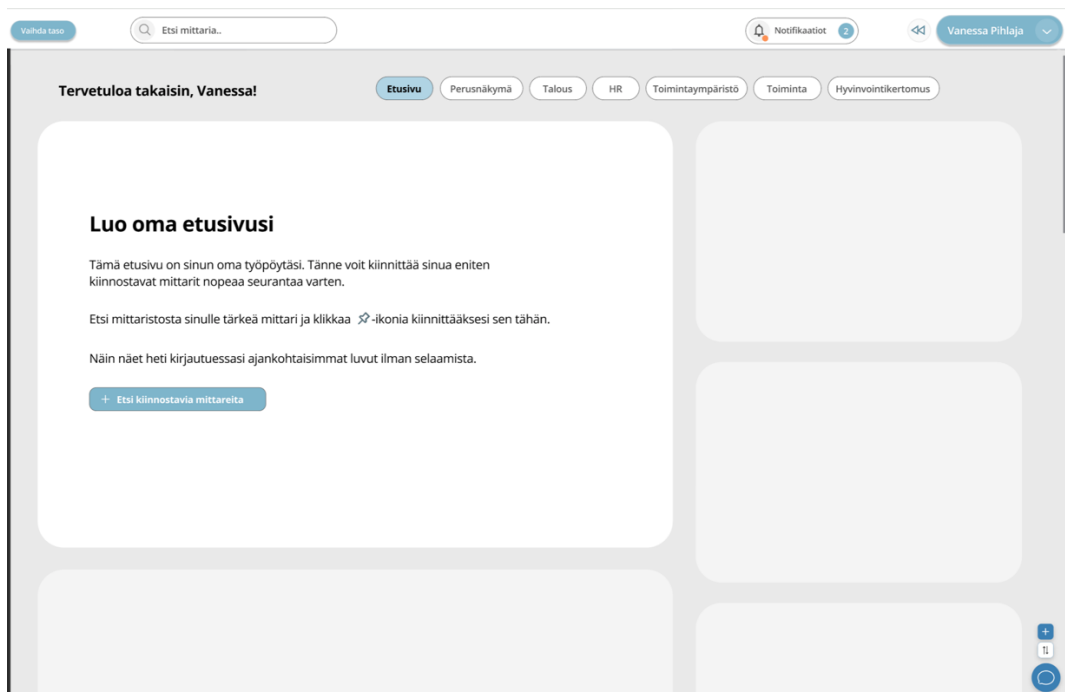


Figure 10. Empty front page with instructions before any indicators are pinned.

These changes address the design objectives of supporting personalised indicator needs, strengthening monitoring and commitment to budget, and reducing cognitive load. By allowing users to focus on their most relevant indicators and cutting the need to scroll, the redesign helps in transforming data monitoring into a more manageable and motivating task. It also improves Nielsen's heuristics of user control and freedom, recognition rather than recall, and aesthetic and minimalist design.

Chatbot

The chatbot is a new feature of JT launched after the interviews were conducted. However, in the current version, the chatbot only exists as a small and easily overlooked button (Figure 11). In the new design, the button is made more visible and accessible. To encourage use, a reminder nudge (Figure 12) is added so that the surroundings darkens slightly and a short message is displayed for users who have not used the chatbot at all or for a

certain period (e.g. four months). This gentle prompt draws attention to the chatbot and encourages users to explore it.

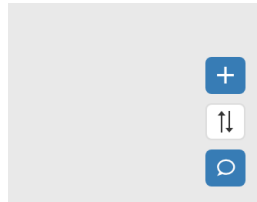


Figure 11. The chatbot button in the current interface.

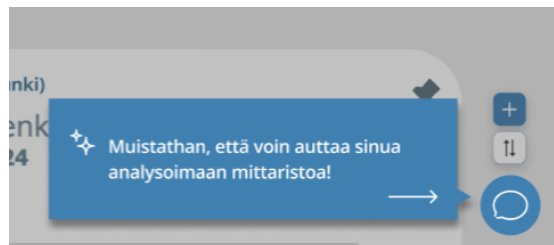


Figure 12. Reminder nudge encouraging inactive users to interact with the chatbot.

The chatbot directly supports the design objective of bringing data into meetings and decision-making. It enables users to quickly generate key insights and bullet point summaries from indicators, making it easier to communicate findings in meetings and discussions. To lower the bar even further, the new design includes a couple of ready-made prompts (Figure 13), which the user can select instead of typing questions manually. This applies the nudging technique simplification, by reducing the effort to start interaction and making the chatbot feel more approachable.

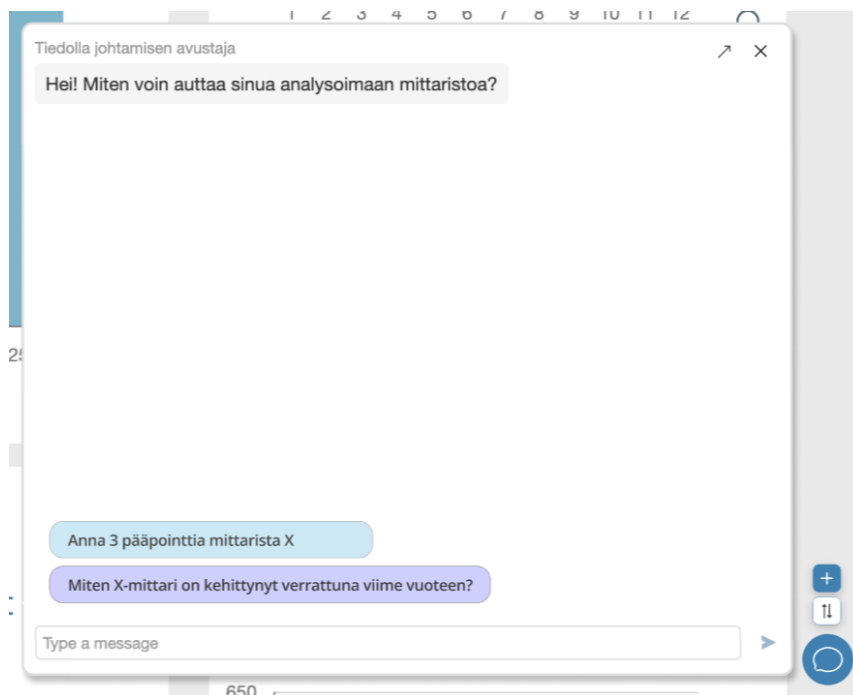


Figure 13. Redesigned chatbot with ready-made prompts.

These changes improve Nielsen's heuristics flexibility and efficiency of use, as well as help and documentation, as the redesigned chatbot with nudges provides assistance and make the use more efficient. Overall, the redesign encourages more active engagement with the data and lowers barriers for integrating JT into everyday management practices.

Setting the default level

The default level in JT determines which indicators the user sees when opening the system. For example, a school principal should typically view data from level of their own school or the education sector. However, interviews revealed that many users had likely not set their default level, which resulted in them seeing all available indicators across their municipality. This increased cognitive load and made the interface appear unnecessarily complex. One possible reason for this is that the default level can only be changed through the system settings, which many users might be unaware of.

In the redesign, the option to set or change the default level was brought closer to the user. The “*Vaihda tasoa*” (*Change level*) button remains in the top navigation bar as before (Figure 14), but the user can now directly set their preferred level within the same view by clicking the “*Aseta oletustasoksi*” (*Set as default*) button (Figure 15). This allows users to change their default view at the same time as they navigate between levels.



Figure 14. The redesigned “*Vaihda tasoa*” (*Change level*) button in the top navigation

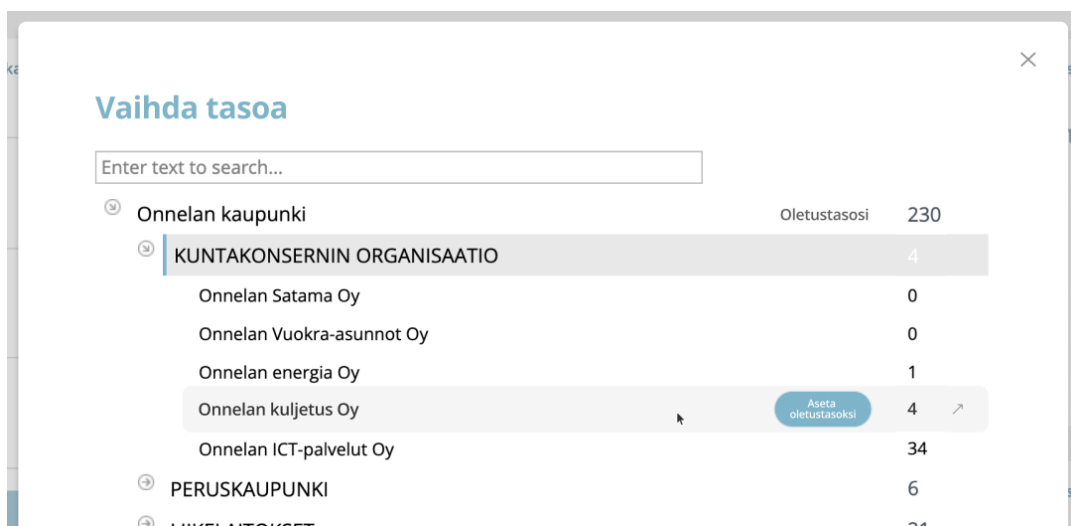


Figure 15. Redesigned chatbot with ready-made prompts.

This improvement applies the nudging principle of status quo bias, or more specifically, a default method. The *Set as default* -button encourages users to set a meaningful level that persists over time. It supports the design objective of reducing cognitive load, as users now see only the indicators relevant to their role or organisation instead of the entire dataset. The change also strengthens Nielsen’s heuristic of visibility of system status, and user control and freedom, as it makes the system more transparent and easier to

manage. Also, the aesthetic and minimalist design is improved when the user has the right default level.

Notifications

Notifications were added as a completely new feature in the redesign to improve communication and sense of belonging between the system and its users. This addition was discussed and confirmed separately with the client organisation, as it requires a bigger implementation. Through notifications, the system can inform users about new indicators, updates, or reminders, helping them stay up to date and more engaged with the platform.

When new notification appears, it briefly pops up on the screen (Figure 16), drawing the user's attention. All notifications can also be reviewed and opened (Figure 17). Each message contains a short description and a direct link to the related indicator or feature if it exists.

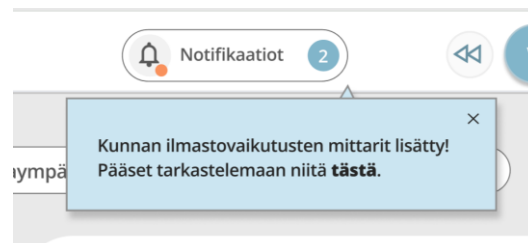


Figure 16. A pop-up notification appearing on the screen.

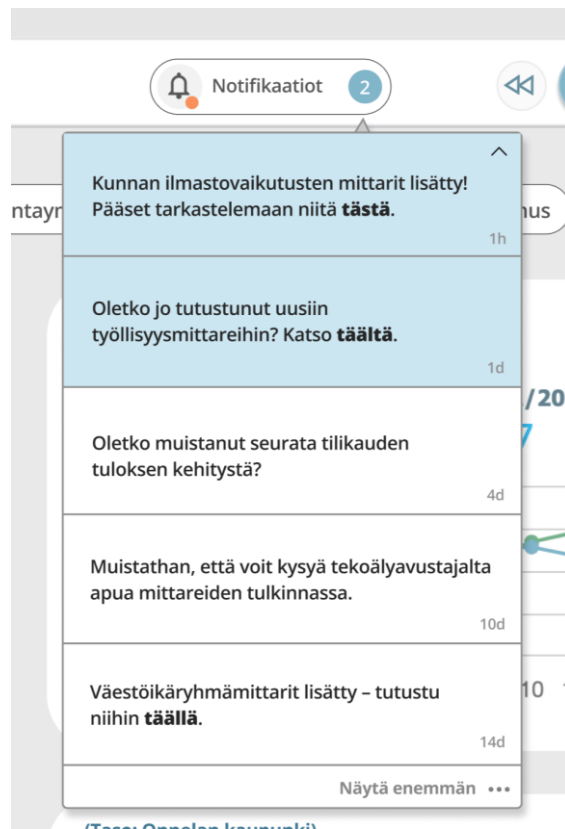


Figure 17. List of recent notifications with links to related content.

The feature is added to support the design objectives of increasing engagement, and strengthening monitoring and commitment to budget. Timely reminders and messages can encourage users to explore content. The notifications employ the messenger effect nudging technique. As the notifications communicate with users in a friendly and guiding tone, they can increase the feeling that their attention and participation are valued. This ongoing interaction can nurture a feeling of belonging and make the platform seem more active and responsive, and therefore encourage returning to the platform more frequently

From usability perspective, this addition strengthens Nielsen's heuristics of visibility of system status, since the users are better kept informed about changes and reminded of relevant content.

Email reminder

Email reminders are added as an addition to the notification system, having a similar purpose but reaching users outside the platform. The goal of these reminders is to encourage inactive users to return to the JT system. Compared to in-platform notifications, the emails are sent only occasionally to avoid being perceived as spam and are only targeted to inactive users.

The email reminders (Figures 18-19), similarly to notifications, use the messenger effect nudge, but the purpose is to nudge users to return to the platform. Each email includes a short message and a call-to-action link to direct users back to the platform. The messages have a positive and human-like tone to make them feel more personal and relatable, helping users perceive them as a genuine and supportive reach rather than an automated alert.

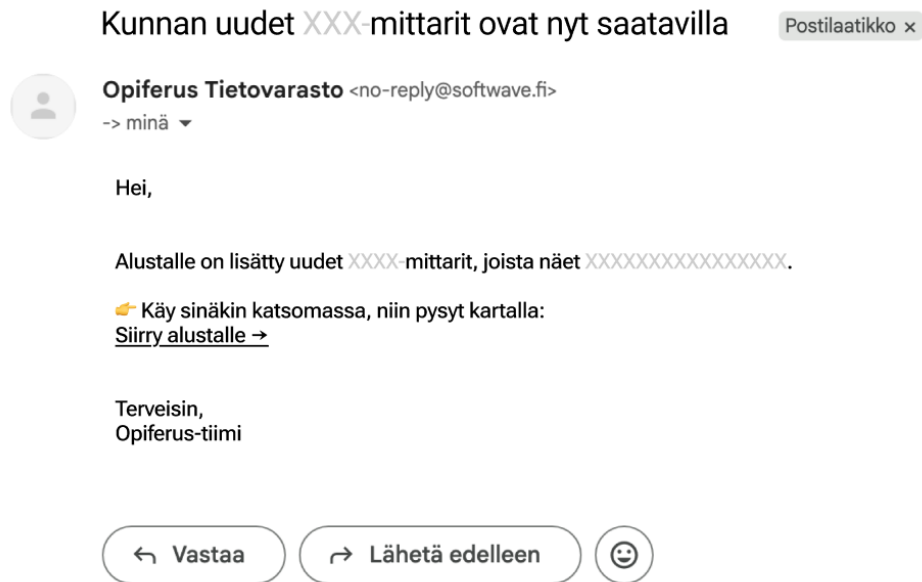


Figure 18. Email reminder example announcing new indicator additions to the platform.

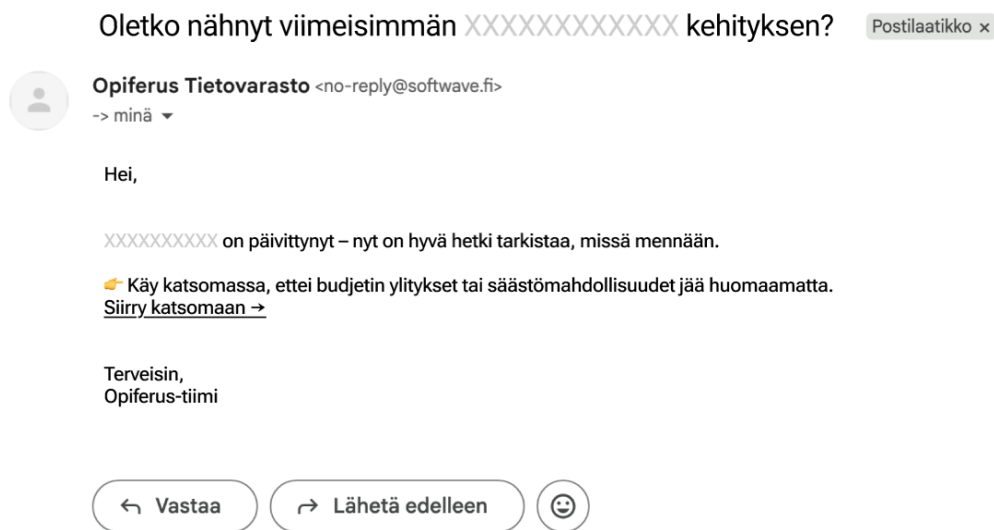


Fig-

ure 19. Email reminder encouraging users to review updated data.

The message contents also include two nudging techniques. In the first message, the phrase “*Käy sinäkin katsomassa*” (*You should also check*) (Figure 18) draws on social norms. It creates a subtle sense of shared participation and also implies that others are already engaging with the platform, making users want to act like others. Additionally, on the second message (Figure 19), the phrase “*ettei budjetin ylitykset ja säästömahdollisuudet jää huomaamatta*” (*so that budget overruns or savings opportunities don't go unnoticed*) reflects loss aversion -nudge as it emphasizes the potential negative consequences of inaction and therefore motivates users to act.

Together, these techniques support the design objectives of increasing engagement, and strengthening monitoring and commitment to budget, by encouraging users to return to the system regularly and to follow their financial data more actively.

Data drilling

The data drilling feature allows users to explore the indicators at a more detailed level. In the current UI, these actions are hidden behind an additional

click. The “Info” and “Poraudu” (Drill) buttons only appear after opening the indicator view. In the redesign, these buttons are now visible by default without the need to open the indicator (Figure 20). Extra padding was added around each indicator to make space for the icons without changing the indicator size itself.

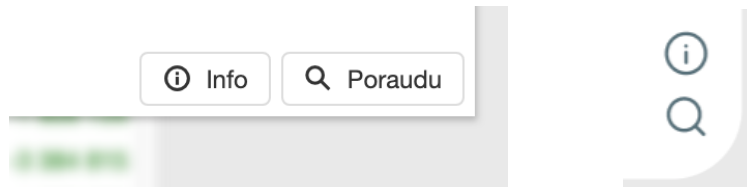


Figure 20. Comparison of the current (left) and redesigned (right) data drilling buttons. The buttons in the current version become visible only after clicking the indicator, while in the redesign they are visible by default.

This small change enhances usability by reducing unnecessary steps and by making possible actions immediately accessible. It supports the design objective of improving navigation and exploration by making data exploration quicker. It also aligns with Nielsen’s heuristic of flexibility and efficiency of use, allowing both new and experienced users to move through data more quickly and intuitively.

Overall feeling

In addition to these more specific improvements, the redesign aimed to create a clearer, more coherent, and modern overall look for the JT system. The current UI appeared dense and unmotivating, with limited spacing and elements that didn’t always visually communicate their purpose that clearly.

To improve the overall feeling, the spacing and key elements were taken into focus. Buttons and interactive components were redesigned to look more distinct and consistent (Figures 21-22). The button shapes, colours, and shadows should now provide a clearer indicator of their purpose, and help

users immediately recognise which elements are clickable. In addition, spacing between some elements were added to make the layout lighter and easier to scan, reducing visual clutter and cognitive load.



Figure 21. Some buttons from the top menu in the current UI.



Figure 22. Redesigned versions of the top menu buttons.

These refinements collectively strengthen the design objectives of ensuring usability and reducing cognitive load, while also improving the quality and professionalism of the interface. In terms of Nielsen's heuristics, the redesign supports better aesthetic and minimalist design, as well as consistency and standards.

Together, these design improvements of the JT system form a coherent and user-centred interface that supports everyday use and encourages engagement. The improvements collectively make the system easier to use, more motivating, and better respond to user's needs. The redesign also demonstrates in a concrete way how usability heuristics and behavioural design principles can be used to address the identified goals and challenges. By clarifying the structure, reducing cognitive load, and introducing subtle motivational cues, the new UI supports municipalities in adopting data-driven practices more effectively. In this way, the artefact provides a practical answer to RQ2, presenting a UI that directly addresses the identified goals and challenges, and enhances user engagement. A summary of how the design objectives, implemented design changes, and applied principles align is presented in Table 4.

Design objective	Implemented design change	Applied nudging techniques and Nielsen's heuristics	
Strengthen monitoring and commitment to budget	Own view Notifications Email reminder	Nudging: Simplification Messenger effect Social norms Loss aversion	Nielsen's: User control and freedom Recognition rather than recall Aesthetic and minimalistic design Visibility of system status
Bring data into meetings and decision-making	Chatbot	Nudging: Simplification	Nielsen's: Flexibility and efficiency of use Help and documentation
Increase engagement	Notifications Email reminders	Nudging: Simplification	Nielsen's: Visibility of system status
Ensure usability	Navigation Search Data drilling Overall feeling		Nielsen's: Consistency and standards Flexibility and efficiency of use Recognition rather than recall Aesthetic and minimalistic design
Support personalised indicator needs	Search Own view	Nudging: Simplification	Nielsen's: Flexibility and efficiency of use Recognition rather than recall User control and freedom Aesthetic and minimalistic design
Reduce cognitive load	Navigation Search Own view Setting the default level Overall feeling	Nudging: Simplification Status quo bias (default)	Nielsen's: Consistency and standards Flexibility and efficiency of use Recognition rather than recall User control and freedom Aesthetic and minimalistic design Visibility of system status
Improve navigation and exploration	Navigation Search Overall feeling		Nielsen's: Consistency and standards Flexibility and efficiency of use Recognition rather than recall

Table 4. Overview of design objectives, corresponding design changes, and applied nudging techniques and Nielsen's heuristics.

6 Discussion

This chapter discusses the main conclusions of the study, the implications for both practice and research, as well as the limitations and directions for future work. The discussion connects the empirical findings and the design outcomes to the broader context of data-driven management in municipalities. It reflects on how the identified user needs and challenges were addressed through the redesign of JT, what can be learned from the process, and how these insights can guide future development, both in the client organisation and in similar public-sector systems.

6.1 Conclusions

This thesis was set out to understand the needs and challenges of data-driven management in municipalities, and to explore how digital systems, particularly JT, can better support these needs. The study focuses on the case of JT, aiming to identify its users' problems and needs, and to propose a design solution that enhances usability and engagement. The work was guided by these two research questions:

RQ1: What specific challenges or tasks do users hope to address with the product, and what usability issues hinder their current experience?

RQ2: What type of user interface design would address the identified goals and challenges, and improve user engagement?

6.1.1 Addressing RQ1: User needs and challenges

The study confirmed that while the municipalities recognise the importance of data-driven management, the everyday use of related systems remains

limited. Interviewees described JT as useful in principle but difficult to navigate and time-consuming to learn. Users appreciated the availability of visualised financial and operational data, but struggled with information overload, difficult advanced features and unclear hierarchies. These issues increase cognitive effort and discourage regular use.

Underlying these usability challenges were also organisational and cultural factors. IT and financial leaders recognised that all employees should follow the financial data to some extent in the tightening financial situation, yet many staff members did not perceive this as part of their responsibilities. Leadership plays a crucial role in driving adoption, but so far, the motivation and communication to promote system use among a wider employee base have remained limited. Joint review of data and goals was considered a practical way to encourage engagement, but such practices were not yet established. Users felt that more activation and reminders were needed to make the use of the system sustain. In addition, several departments rely on their own systems for their operational data, which reduces the perceived necessity of using JT.

6.1.2 Addressing RQ2: Design responses

The redesign of the JT is presented in more detail in Chapter 5. The findings from the interviews were translated into design objectives, that link the user needs and problems into concrete objectives. Together, these objectives form a framework for improving the usability and engagement of JT. The design objectives and the design choices made to answer these are presented below:

Strengthen monitoring and commitment to budget

Many employees did not see financial monitoring as part of their responsibilities. To address this, the redesigned UI aims to make data as easy to follow as possible. The front page was renewed to be display only the user's

favourite indicators, which can be pinned to create a personalised overview. Additionally, notifications and email reminders were introduced to encourage regular budget follow-up and remind users to monitor financial situation.

Bring data into meetings and decision-making

Joint review of data and goals was seen as a promising but underused practice to support adoption. To promote this, the redesign improves the new chatbot feature by making it more visible and adding ready-made prompts that guide users to quickly get the key insights and recent changes in the data. This helps bring the most relevant information into discussions and decision-making contexts.

Increase engagement

Interviews revealed the need for activation and reminders to help users engage with the system. The redesign introduces notifications and email reminders to draw users' attention both inside and outside the platform. In addition, chatbot prompts nudge users to interact with the chatbot and explore the data. These features aim to strengthen engagement both within sessions and between sessions by encouraging interaction in the moment and prompting users to return over time. Moreover, all improvements made aim to strengthen the perceived value of the system, which then contribute to longer-term engagement, as noted in the Background chapter.

Ensure usability

Given the diverse backgrounds of municipal employees and the steep learning curve interviews revealed, the new interface makes changes to improve overall user-friendliness. Buttons were redesigned to be more recognisable, the visual hierarchy was clarified, and spacing was added to make the layout cleaner.

Support personalised indicator needs

The interviews revealed that indicator needs vary significantly between users, and therefore the front page was redesigned into an own view, showing only indicators that each user chooses there. This way users can immediately see indicators that they are interested in.

Reduce cognitive load

The amount of information displayed to users caused cognitive overload and reduced motivation to use the system. To address this, the redesign applies several solutions: own view to simplify the front page, a search function enabling quick access to specific data, a ready-made chatbot prompts to make interaction easier, and the default level setting made more visible and straightforward. These features help users to focus on essential information without being overwhelmed.

Improve navigation and exploration

Interviews revealed that users struggled to navigate within the system and locate specific indicators. The new design introduces simplified navigation that clarifies the overall structure of the system. Additionally, a search function was added for finding data quickly, and data drilling functionality was made more visible.

6.1.3 Limitations of UI design in addressing user needs

While the redesign addresses several usability and engagement issues identified in the interviews, not all challenges can be solved through UI design alone. Some identified problems extend beyond the boundaries of the interface or were deliberately excluded from the scope of the redesign.

Certain issues, such as data import and integration, and own indicators and views, were considered important, but only relevant mainly for a specific user group, the active users, which were left outside the scope of the redesign.

Data source transparency and timeliness, on the other hand, were not significant enough in the interview findings to justify design attention.

Other areas, such as technical accessibility and visual presentation, were already evaluated positively by users and therefore did not require design changes. Data centralisation as well as data processing and reporting were also raised as user needs, but something that the system already answers to, and no issues related was raised.

Some challenges simply fall outside the reach of UI design. These include things such as departments' own systems, which operate independently of JT and cannot be influenced through interface changes, as well as deeper data processing needs raised by a few active users, which would require architectural rather than design-level improvements.

More importantly, several challenges identified under the theme of adoption and motivation extend beyond the interface itself. While UI design can support engagement through reminders, nudges, and personalisation, the adoption strongly depends on leadership commitment and organisational culture in the end. For data-driven management to become a sustained practice, leadership must not only encourage the use of such systems, but also actively integrate data into everyday discussions and decision-making. In the end, the question of low usage cannot be viewed solely as a UI problem. Even a well-designed interface will not lead to adoption if users do not visit the system in the first place or perceive it as relevant, and valuable, and integrated into their organisational routines.

However, the findings of this study also suggest that while UI design alone cannot create a long-term engagement, it can still indirectly support it by increasing the value users experience within each session. When the interface helps users find relevant insights more easily and feel that the system

supports their work and goals, these positive experiences can accumulate and make recurring use more likely. In this way, UI design can strengthen the foundation for long-term engagement, even though it strongly depends on the organisational practices.

6.1.4 Research contributions

This thesis contributes to both the understanding and the practical development of data-driven management in municipalities. Theoretically, it expands existing knowledge by demonstrating how usability and digital nudging methods can be applied to improve engagement and adoption of public-sector systems.

Empirically, it provides new insights into how municipal employees experience data-driven management in practice, identifying barriers such as lack of motivation, lack of ownership, diverse user groups and fragmented indicator needs. These findings offer an understanding of why data-driven management has not reached the wanted level.

Practically, it delivers a redesigned UI for JT and a set of practical design insights, such as simplifying navigation and layout, adding notifications and email reminders for activation, that can help the development of similar systems aiming to make data easier to access, interpret, and act upon.

In summary, the findings underline how usability and behavioural design can be used to improve engagement with data-driven tools. They demonstrate how well-targeted design changes have the potential to lower the barriers for using data and help integrate data-driven management into daily practices.

6.2 Implications of the study

Building on the conclusions presented above, this section discusses the broader implications of the study, both for practice and research. The purpose is to translate key findings and contributions into actionable guidance for different stakeholders involved in developing and using data-driven management systems.

The implications are discussed from three perspectives. First, the implications for the client organisation highlight how the results can be used to continue development work, particularly through testing, evaluation, and supporting user adoption. Second, implications for municipalities and municipal system developers address how the findings can inform both the design of similar systems and the organisational aspects needed to support their effective use. Finally, the implications for research consider how this study contributes to ongoing academic discussions on usability, behavioural design, and data-driven management.

6.2.1 Implications for the client organisation

For the client organisation, Softwave, these findings offer concrete implications for continuing the development and implementation of JT. The findings show that usability improvements are essential, and next step should be to test and evaluate the proposed changes in practice. The results also indicate that successful adoption depends not only on interface design but also on effective communication, user onboarding, and leadership engagement. These areas should be actively supported and developed alongside the technical improvements.

Because the evaluation of the artefact developed didn't fit into the scope of this thesis, testing the redesigned interface should be the next step. The client could start with lightweight usability testing, such as cognitive

walkthroughs with the prototype, which does not require coding but can inform whether navigation and clarity have improved. For comprehensive results, especially regarding the effectiveness of nudging elements, testing should be done in practice through pilot use in selected municipalities. This would reveal whether redesigned features would influence actual behaviour, engagement, and long-term use.

As the interviews revealed, not all challenges can be solved through UI design alone. The organisational culture plays a major role: data monitoring is still often seen as an additional task, and both leadership and employees struggle to integrate it naturally into meetings and daily discussions. To address this, the client could support especially municipal leadership by offering practical guidance and examples on how to embed system use into regular management routines and motivate wider participation. Improving onboarding materials and lowering the learning curve would also help employees see the system as a supportive rather than demanding tool. By framing JT as a management and communication tool rather than only a reporting platform, engagement across departments and could be strengthened and data use normalised in everyday work.

In summary, combining the design proposals with the recommendations for enhancing communication, onboarding, and leadership engagement provides a comprehensive direction for future development. To ensure continued progress that aligns with users' goals, regular user feedback should be gathered to guide future development.

6.2.2 Implications for municipalities and system developers

For municipalities, the findings highlight that successful data-driven management requires more than just buying technical tools. It requires leadership example and everyday routines, where the process of making decisions and discussing them is always done based on data. Municipal leaders can

strengthen adoption by showing example, and actively using systems like JT in meetings, linking data into decision-making, and encouraging open discussion around results. By embedding data into regular management practices helps turn data-driven management from an abstract goal into a shared habit.

For other parties that develop similar data-informed systems for the public sector, the results underline the need to prioritise simplicity, personalisation, and behavioural support. Tools must be designed for diverse user groups with varying levels of confidence on both analysing data and using digital systems. Features such as clear navigation, tailored dashboard views, and subtle activation cues can lower the effort required to use the system and increase return use. In practice, this means focusing on usability and user motivation rather than the amount of available data or the depth of technical features.

6.2.3 Implications for research

This study contributes to research on data-driven management in the public sector by applying DSR to explore how digital tools can better support everyday decision-making. It adds a human-centred perspective to the field by focusing on how usability and behavioural factors influence the adoption and use of data-driven systems in municipalities. In doing so, the study broadens the understanding of what successful data-driven management requires in practice and how it can be supported through interface design.

The research also extends existing theory on usability and digital nudging by demonstrating how these approaches can be applied in a public-sector context. While such methods, especially nudging, are often examined in commercial settings, this study shows their relevance in government organisations.

Finally, the study reinforces the methodological value of DSR for addressing public-sector challenges. It shows how by combining theoretical understanding with artefact development can create both practical and theoretical knowledge and helps bridge the gap between research and application in municipal digitalisation.

6.3 Limitations

As with any qualitative and design-oriented study, certain limitations must be acknowledged when considering the generalisability of the findings. First of all, the results are based on a single case, JT, and insights are gathered from seven user interviews. While the interviews provided a rich qualitative understanding, the sample limits the extent to which the findings can be generalised. Differences in municipality size and organisational culture may also affect how the results apply in other contexts.

Another limitation related to the interview group and the chosen target users of the redesign. The interviews were primarily conducted with municipal IT and financial managers, who offered valuable perspectives on how the system is used across their municipalities. However, they were not the main end-users that the final design improvements were ultimately aimed at. Their insights served as an important window into broader usage patterns, but they may not fully represent the experiences of other staff members.

Finally, the artefact created in this thesis was not tested in practice. This means that the actual effectiveness of the proposed design solutions in addressing user needs and increasing engagement cannot be verified within the scope of this study. Nevertheless, the redesign was grounded on empirical findings and established theoretical principles, which support its credibility and potential transferability to similar contexts.

6.4 Future research

As mentioned previously, future research should be conducted on the evaluation of the redesigned JT interface. Testing the artefact in a real municipal setting would assess how the proposed design solutions affect usability, engagement, and the integration of data-driven practices into everyday routines. In addition to evaluating the design itself, future studies could also examine how organisational culture, leadership practices, and communication can be strengthened to better support the adoption of data-driven management in municipalities.

Further studies could also broaden the scope for perspectives included. While this thesis focused on municipal employees, future research could capture the data-related needs and expectations of other municipal stakeholders, such as the municipal council and board. Examining how these groups interpret, use, and value data could reveal important factors in how data-driven management can be strengthened across the whole municipality.

Finally, longitudinal research would be valuable in examining the long-term effects of usability improvements and digital nudging interventions. Tracking user behaviour and engagement over time would offer a deeper understanding of how behavioural design techniques and designed interface features support sustainable adoption of data-driven practices in the public sector.

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